

MOTOR AGE

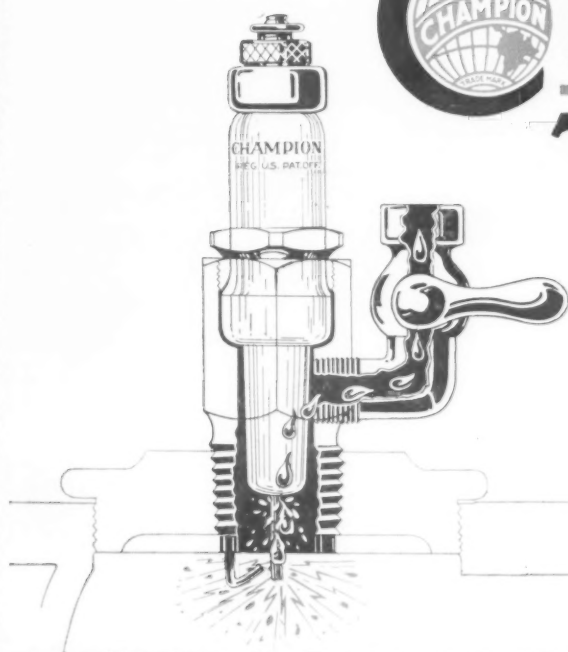
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CHICAGO, NOVEMBER 15, 1917

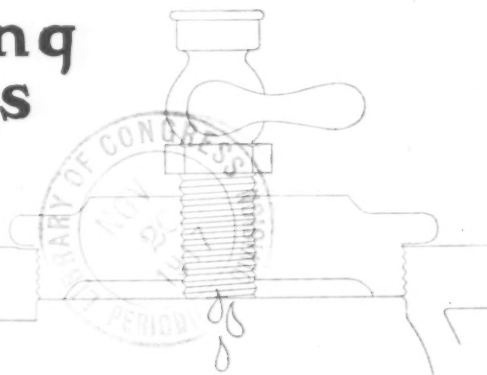
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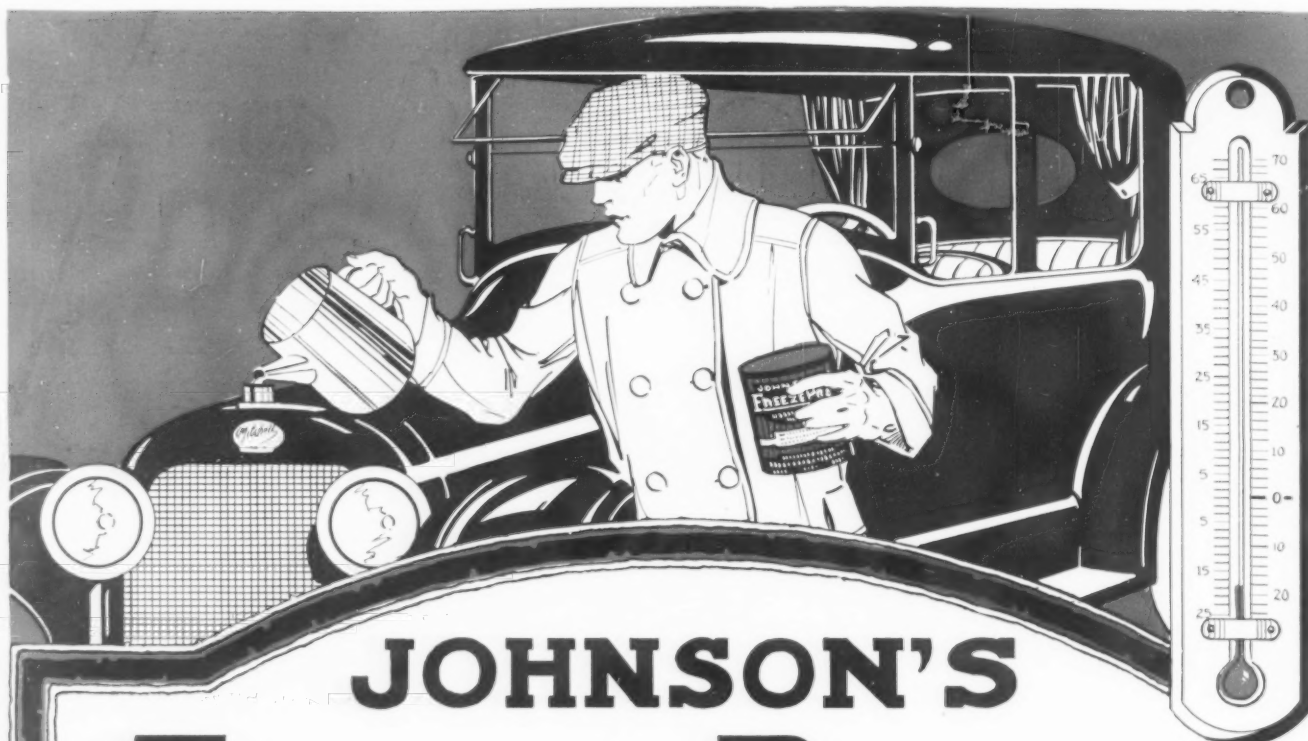
And in a cold motor it does not readily vaporize.

The sure way is to put the gas at the sparking point through Champion Priming Plugs.

Then you have a sure start for a cold motor.

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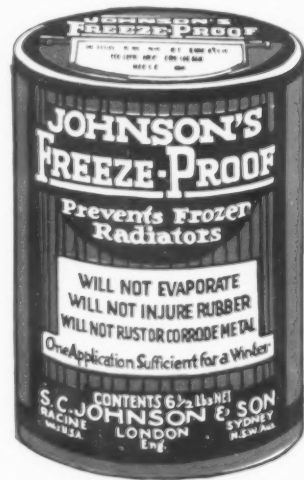
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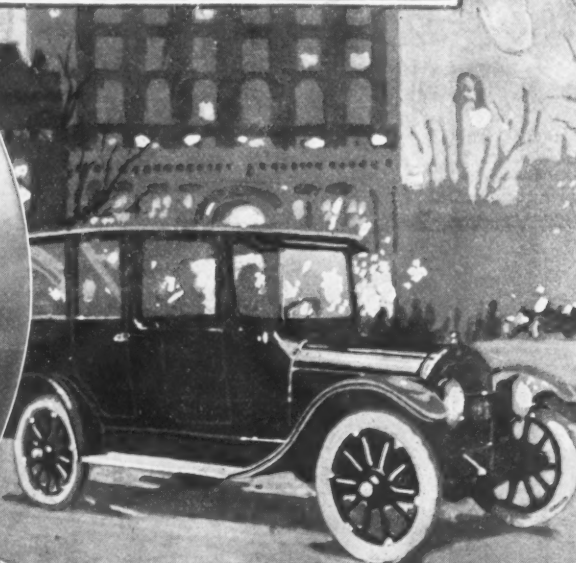
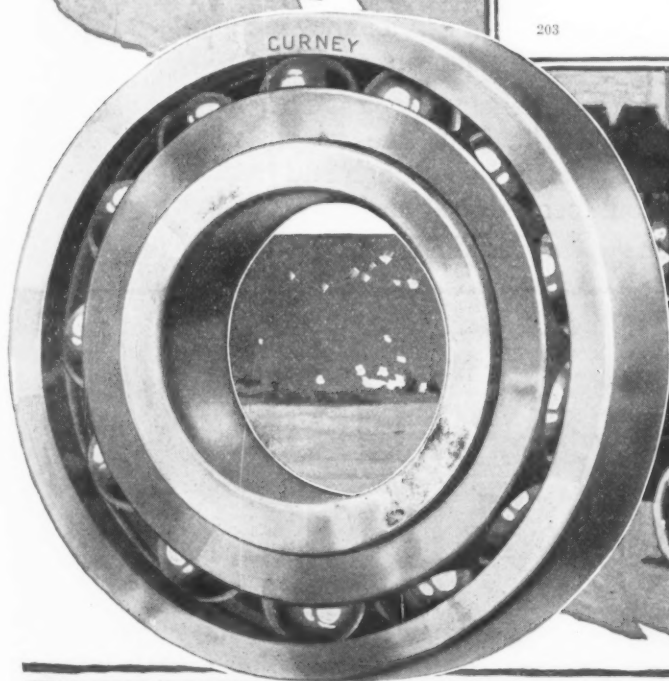
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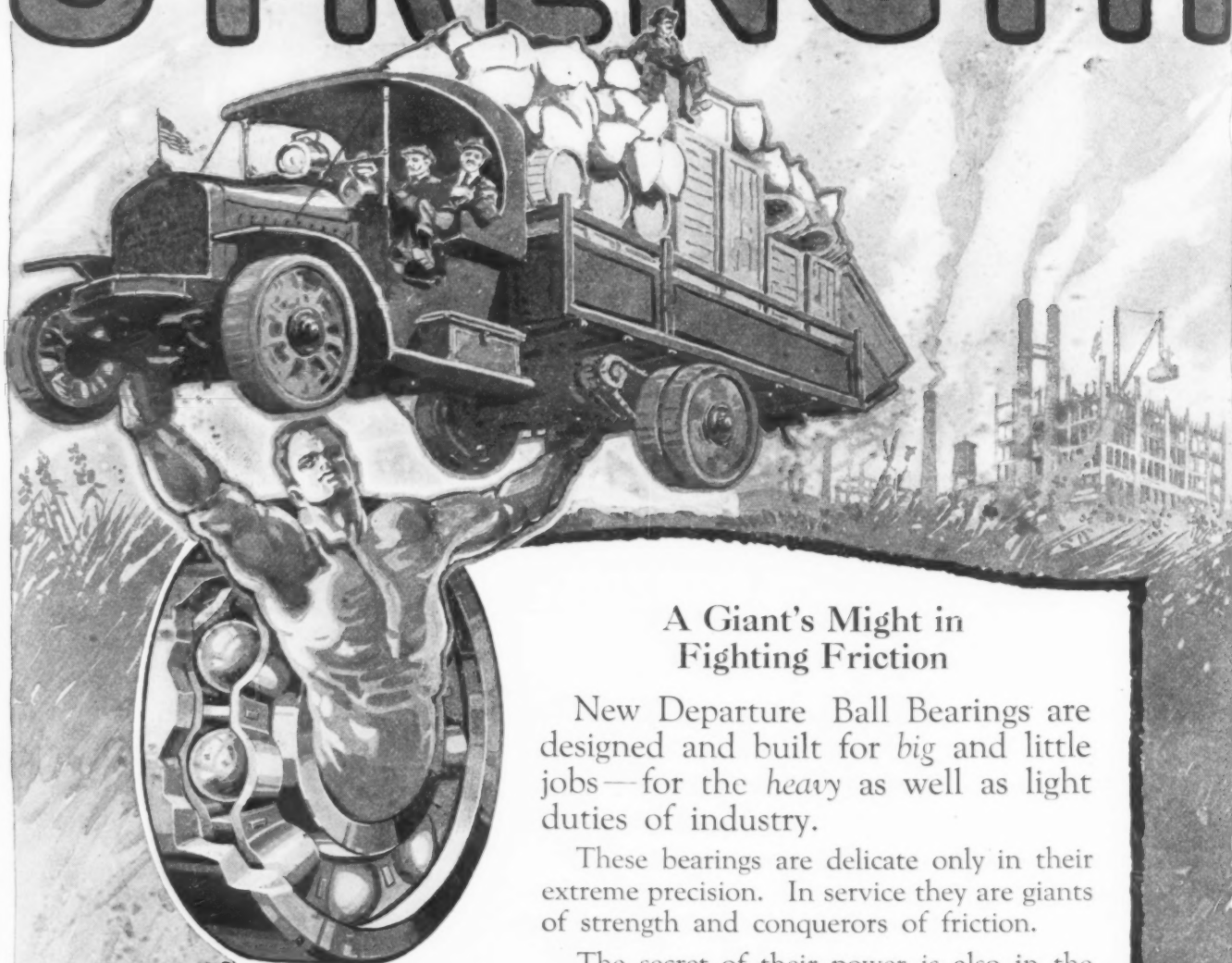
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NEW DEPARTURE BALL BEARINGS

MOTOR AGE

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MOTOR AGE



Pall of War Hits Racing

Review of 1917 Season Fails to Reveal
a Champion—Higher Speeds Made

WAR cast a wet blanket over speedway racing in 1917. The speed sun broke over the horizon in roseate splendor early last spring, just as racing came into its majority. When the 1916 championship awards were made at the Resta-Aitken-Rickenbacher dinner at the Chicago Automobile Club, held on the twenty-first anniversary of racing, announcements came that made the 1917 season promise pros-

perity. Then came our declaration of war and coincident with this came a set-back to speed battles. Indianapolis withdrew, not only the course but its six cars and drivers. The Hoosier event was a classic and its withdrawal left racing promise for this year like an army minus a general. The Indianapolis management offered its plant to the Government.

For a few weeks it was believed there

would be no racing at all, and even after the first two events, each succeeding card was looked upon as the last. It was in this hit-or-miss fashion that the season passed, twenty-six contests being waged—a total mileage of 2380 and a total purse of \$140,250, about half the customary \$100 per mile hung up in previous contests. The one redeeming feature of 1917 racing was greater speeds, there being forty places at better



Earl Cooper ranked with the first four winners of prizes



Louis Chevrolet stands second in the amount of prize earnings

FINISH TIMES AND MILES PER HOUR OF ALL PLACERS IN 1917 SPEEDWAY RACES

M.P.H.	Distance	Car	Driver	Race	M.P.H.	Distance	Car	Driver	Race
110.4	100	Frontenac	L. Chevrolet	Sheepshead	94.9	20	Ogren	Mason	Chicago
109.62	50	Roamer	Henderson	Chicago	94.38	100	Hoskins	Lewis	Minneapolis
109.32	50	Frontenac	Mulford	Chicago	94.36	100	Stutz	Dutton	Minneapolis
108.7	20	Packard	De Palma	Chicago	94.31	250	Hudson	Vail	Chicago
108.6	20	Frontenac	G. Chevrolet	Chicago	94.05	250	Omar	Toft	Cincinnati
106.5	50	Packard	De Palma	Chicago	93.67	250	Frontenac	L. Chevrolet	Chicago
106.5	100	Packard	De Palma	Sheepshead	93.21	56	Hudson	McCarthy	Uniontown
106.3	20	Hoskins	Lewis	Chicago	93.04	56	Hoskins	Lewis	Uniontown
106.2	100	Frontenac	L. Chevrolet	Chicago	92.73	168	Duesenberg	Hearne	Uniontown
105.96	50	Frontenac	Mulford	Chicago	92.71	168	Duesenberg	Milton	Uniontown
105.95	50	Miller	Anderson	Chicago	92.64	100	Frontenac	Sarles	Minneapolis
105.94	50	Pan-American	Alley	Chicago	92.63	250	Mercedes	Fontaine	Chicago
105.93	50	Duesenberg	Milton	Chicago	92.21	50	Hudson	Mulford	Minneapolis
105.92	50	Hoskins	Lewis	Chicago	91.72	56	Peerless	I. Fetterman	Uniontown
105.84	100	Duesenberg	Hearne	Sheepshead	91.50	50	Hudson	Vail	Minneapolis
105.83	100	Frontenac	Mulford	Sheepshead	90.74	50	Hudson	Taylor	Minneapolis
105.81	100	Hudson	Vail	Sheepshead	90.70	112	Delage	Elliott	Uniontown
105.56	20	Pan-American	Alley	Chicago	90.61	100	Hudson	Mulford	Minneapolis
105.54	20	Frontenac	G. Chevrolet	Chicago	89.39	50	Duesenberg	Henderson	Minneapolis
105.5	50	Hoskins	Lewis	Chicago	89.25	112	Newman-Stutz	Taylor	Uniontown
105.50	20	Frontenac	Mulford	Chicago	89.24	112	Pugh	Meyer	Uniontown
105.18	20	Hoskins	Lewis	Chicago	89.10	100	Hudson	Taylor	Minneapolis
105.1	100	Hoskins	Lewis	Chicago	88.97	150	Hudson	Patterson	Tacoma
104.77	20	Miller	Anderson	Chicago	88.637	100	Duesenberg	Milton	Minneapolis
104.2	20	Pan-American	Alley	Chicago	88.633	100	Duesenberg	Henderson	Minneapolis
104.1	100	Packard	De Palma	Chicago	88.21	168	Hudson	Vail	Uniontown
103.15	250	Stutz	Cooper	Chicago	88.08	100	Miller	Cadwell *	Minneapolis
102.85	50	Hoskins	Lewis	Omaha	88.04	56	Hudson	McCarthy	Uniontown
102.62	250	Hudson	Mulford	Chicago	88.03	56	Hudson	Conway	Uniontown
102.5	50	Frontenac	G. Chevrolet	Chicago	87.61	168	Hoskins	Lewis	Uniontown
102.18	250	Frontenac	L. Chevrolet	Cincinnati	87.37	150	Chevrolet	Durant	Tacoma
102.04	250	Delage	Durant	Chicago	86.43	168	Hudson	Hickey	Uniontown
101.52	250	Duesenberg	Hearne	Chicago	84.13	112	Erbes	Burt	Uniontown
101.40	150	Hudson	Mulford	Omaha	81.85	112	Palc	Haibe	Uniontown
100.4	100	Duesenberg	Henderson	Chicago	80.14	150	Hudson	Rhodes	Tacoma
101.38	250	Hudson	Vail	Cincinnati	79.4	20	Olsen	Trekus	Chicago
101.3	20	Duesenberg	Henderson	Chicago	79.12	56	Haynes	Shoff	Uniontown
101.0	50	Duesenberg	Henderson	Chicago	78.24	150	Hudson	Malcolm	Tacoma
100.08	250	Frontenac	G. Chevrolet	Cincinnati	77.20	56	Haynes	N. Fetterman	Uniontown
100.05	150	Duesenberg	Milton	Omaha	75.99	112	Crawford	Ewan	Uniontown
99.8	50	Pan-American	Alley	Chicago	75.86	25	Duesenberg	Milton	Providence
99.66	150	Mercer	Thomas	Omaha	75.37	5	Frontenac	Mulford	Providence
99.39	250	Mercer	Haines	Chicago	75.29	5	Frontenac	L. Chevrolet	Providence
99.31	50	Hudson	Mulford	Omaha	75.28	5	Duesenberg	Milton	Providence
99.22	50	Duesenberg	Milton	Omaha	74.90	5	Frontenac	Boyer	Providence
99.20	50	Duesenberg	Henderson	Omaha	74.65	112	Johnson	Monahan	Uniontown
98.92	100	Hudson	Hickey	Sheepshead	74.53	25	Hudson	Vail	Providence
98.68	100	Mercer	Henning	Sheepshead	73.77	25	Frontenac	L. Chevrolet	Providence
98.52	150	Duesenberg	Hearne	Omaha	73.26	25	Duesenberg	Hearne	Providence
98.49	100	Duesenberg	Milton	Sheepshead	70.84	100	Duesenberg	Milton	Providence
98.41	150	Hudson	Taylor	Omaha	70.81	100	Hudson	Vail	Providence
98.25	150	Mercer	Haines	Omaha	70.16	100	Duesenberg	Hearne	Providence
98.15	250	Duesenberg	Milton	Cincinnati	68.99	25	Pugh	Meyer	Providence
98.09	250	Duesenberg	Henderson	Chicago	68.49	100	Hoskins	Lewis	Providence
97.60	250	Hoskins	Lewis	Chicago	68.36	100	Stutz	Cooper	Los Angeles
97.27	50	Stutz	Dutton	Minneapolis	67.95	100	Mercer	Pullen	Los Angeles
97.24	100	Benedict	Benedict	Sheepshead	66.92	100	Pugh	Meyer	Providence
97.18	250	Stutz	Cooper	Cincinnati	66.20	100	Omar	Toft	Los Angeles
96.28	100	Hudson	Vail	Minneapolis	66.2	100	Pan-American	Alley	Chicago
96.23	250	Hudson	Patterson	Cincinnati	65.26	100	Duesenberg	Henderson	Providence
96.20	250	Ogren	Henning	Cincinnati	65.11	100	Delage	Elliott	Providence
95.16	150	Hoskins	Lewis	Omaha	63.7	100	Olsen	Trekus	Chicago
94.90	250	Hudson	Mulford	Cincinnati	63.66	100	Frontenac	L. Chevrolet	Providence

Ralph de Palma won the most this season, \$16,834.83

than 100 m.p.h., whereas last year there were but twenty-one.

For several years MOTOR AGE made the titular award of the speedway championship. Last year the American Automobile Association took in hand the plan fostered by MOTOR AGE, and awarded points on each championship event so that crowning the champion in 1917 resolved itself into an addition of the points made by each and selecting the one with the highest standing. This year MOTOR AGE makes no attempt to place the crown of glory on any driver but here outlines the achievements of the season and leaves the award to the reader.

Effect of War

Summing up the season we find in brief the following: War eliminated foreign competition, caused one speedway to withdraw from racing until after the war and withhold six fast racing cars and kept the race fans away from the tracks, causing the promoters to lose money. One speedway is being dismantled, another went to the outlaws, a third conducted no races this year and another attempted to come back into popularity after winning disrepute in 1916, only to find that this was not possible.

In face of the A. A. A.'s determining a year ago it never would sanction another meet that provided for the drivers to share in the gate, this was allowed quite generally this year, and except in one instance the drivers divided nothing. In some cases where prize money was put up, the attendance was so small that the gate did not cover the prize money.

Four drivers each won three events—De



Ralph Mulford made most of his
winnings in a Hudson

Palma, Mulford, Chevrolet and Cooper. De Palma took two at Chicago—a 20-mile and a 50-mile, which, by the way, were the first Ralph ever won on the Chicago oval—and one at New York, this one being three heats, all of which he won, the three totaling 100 miles. He also took one second at New York and a third at Chicago—both 100-mile events. His average speed for these three races was 107 m.p.h. At this rate of speed he could have made the run from New York to San Francisco in 29 hr. 47 min., New York to Chicago in 8 hr. 30 min., or Duluth to New Orleans in 13 hr. 5 min.

Mulford took three firsts—Omaha 150-mile, Providence 5-mile and Chicago 50-mile—four seconds, Chicago, Minneapolis and Omaha 50-mile events, and Chicago 250 contest—one third, a 20-mile event at Chi-

cago, and one fourth, a 100-mile at New York. He traveled a total of 725 miles in these races, at an average speed of 100.68 m.p.h.

Chevrolet took three firsts—250-mile at Cincinnati, a 100-mile at Chicago and a 100-mile at New York, the last being the fastest race of the year—110.40 m.p.h. He also took a second in the 5-mile at Providence and a third in the 25-mile at Providence.

Earl Cooper came out of the West this year with a victory to his credit at Ascot in mid-winter and won the Chicago 250-mile derby at 103.15 m.p.h. then went back to the coast and won the 100-mile Army Post Special at Tacoma, Sept. 3, but for some reason records of the time he made there are missing.

Playing with the figures a little more we

RECORD OF CARS IN 1917 RACES

This table includes all major speedway races and all positions up to ten for each car regardless of prize money

[illegible]

find that Dave Lewis was the most consistent placer of the year, being unplaced but twice in sixteen starts. Lewis started more times than any other driver in 1916 also. Ralph Mulford and Tommy Milton are the only others who placed ten times or more. Mulford placing twelve times in fifteen starts, and Milton, ten in fourteen.

The major part of the prize money was won by six drivers, de Palma heading the list with \$16,834.83, although this amount is but a part of his season's winnings with the Packard twelve-cylinder mount he tied his hopes to when he turned over the old Mercedes that carried his jinx so long, to Louis Fontaine, his former mechanic. De Palma and Oldfield coined money in match events throughout the season, Barney pitting the speed of his Golden Egg—a Miller-engined speed creation with a coupe body—against the Packard, but Ralph usually was the victor.

Louis Chevrolet stands second in prize winnings this year with a total of \$15,733.48, Cooper third with \$14,100, Mulford

RECORD OF DRIVERS IN 1917 RACES

Driver	Starts	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Un.
Cooper	5	3	0	1	0	0	1	0	0	0	0	0
Pullen	1	0	1	0	0	0	0	0	0	0	0	0
Toft	7	0	0	1	0	0	0	0	0	0	1	5
Taylor	7	1	0	0	1	2	1	0	0	0	0	2
Boyer	10	1	1	0	1	0	0	0	0	0	0	7
Hearne	10	1	0	3	3	1	0	0	0	0	0	2
L. Chevrolet	14	3	1	2	1	0	0	0	1	1	0	5
G. Chevrolet	6	0	2	2	0	0	0	0	0	0	0	2
Lewis	16	1	3	2	3	2	0	2	0	0	0	2
Klein	1	0	0	0	0	0	1	0	0	0	0	0
Meyer	6	0	1	0	0	2	0	1	0	0	0	2
Mulford	15	3	4	1	1	1	0	0	1	1	0	3
Oldfield	5	0	1	0	0	0	0	0	0	1	0	3
McBride	4	0	0	0	0	0	0	0	0	0	1	3
Vail	10	1	4	2	0	1	0	0	1	0	0	1
Milton	14	2	2	2	2	0	0	0	2	0	0	4
Patterson	4	1	0	1	0	0	0	1	0	0	0	1
Henning	4	0	0	0	0	0	0	1	1	0	0	2
Durant	3	0	2	1	0	0	0	0	0	0	0	0
Haines	2	0	0	0	0	1	1	0	0	0	0	0
Henderson	15	1	0	0	3	1	3	0	0	1	0	6
Fontaine	4	0	0	0	1	0	0	0	0	0	1	2
DePalma	8	3	1	1	0	0	0	0	0	0	0	0
McCord	1	0	0	0	0	0	0	0	0	0	0	1
Burt	7	0	0	1	0	0	0	0	1	0	0	5
Stringer	1	0	0	0	0	0	0	0	0	0	0	1
Ostewig	1	0	0	0	0	0	0	0	0	0	0	1
Lecain	3	0	0	0	0	0	0	0	0	0	0	3
Devigne	3	0	0	0	0	0	0	0	0	0	0	3
Ewan	4	0	0	0	0	1	0	0	0	0	0	3
Buzane	2	0	0	0	0	0	0	0	0	0	0	2
Thomas	3	0	0	1	0	0	0	0	0	0	0	2
Monahan	2	0	0	0	0	1	0	0	0	0	0	1
Alley	9	1	0	1	1	2	0	0	0	0	0	4

RACE RECORDS OF THE 1917 SEASON

GEORGE WASHINGTON SWEEPSTAKES, 100 MILES, LOS ANGELES, CAL., MARCH 4

Order	Driver	Car	Time	M.P.H.	Purse
1	Cooper	Stutz	1:27:46	68.36	\$ 3,000
2	Pullen	Mercer	1:28:18	67.95	1,250
3	Toft	Omar	1:30:38	66.20	750

Also started—Boyer, Frontenac.

UNIVERSAL TROPHY RACE, 112 MILES, UNIONTOWN, PA., MAY 10

Order	Driver	Car	Time	M.P.H.	Purse
1	Taylor	Newman-Stutz	1:15:38	89.25	\$ 3,000
2	Boyer	Frontenac			2,000
3	Hearne	Duesenberg			1,000
4	L. Chevrolet	Frontenac			900
5	Lewis	Hoskins			800
6	Klein	Johnson	Times not obtainable		700
7	Meyer	Pugh			600
8	Mulford	Hudson			500
9	Oldfield	Delage			300
10	McBride	Olsen			200

Running at the finish—De Palma, Packard; McCord, Crawford. Also started—Fontaine, Mercedes; Vail, Hudson; Burt, Erbes Special.

SHARONVILLE SWEEPSTAKES, 250 MILES, CINCINNATI, OHIO, MAY 30

Order	Driver	Car	Time	M.P.H.	Purse
1	L. Chevrolet	Frontenac	2:26:47.90	102.18	\$10,000
2	Vail	Hudson	2:27:57.44	101.38	5,000
3	G. Chevrolet	Frontenac	2:28:45.73	100.08	2,500
4	Milton	Duesenberg	2:32:47.55	98.15	1,750
5	Hearne	Duesenberg	2:34:17.36	97.18	1,500
6	Cooper	Stutz	2:34:28.47	97.10	1,100
7	Patterson	Hudson	2:35:48.05	96.23	900
8	Henning	Ogren	2:35:49.66	96.20	800
9	Mulford	Hudson	2:38:05.05	94.9	750
10	Toft	Omar	2:39:28.92	94.05	700
11	Oldfield	Delage	2:39:51.65	93.80	

Also started—De Palma, Packard; Stringer, M.E.L.; Ostewig, Ostewig; Lecain, Delage; Devigne, Delage; Ewan, Crawford; Buzane, Detroit Special; Fontaine, Mercedes; Haines, Mercer; Thomas, Mercer; Henderson, Mercer; Taylor, Newman-Stutz; Burt, Erbes Special; Lewis, Hoskins; Monahan, Johnson; Henning, Ogren.

CHICAGO DERBY, 250 MILES, JUNE 16

Order	Driver	Car	Time	M.P.H.	Purse
1	Cooper	Stutz	2:25:28.80	103.15	\$ 8,000
2	Mulford	Hudson	2:26:11.03	102.62	5,100
3	Durant	Delage	2:23:36.43	102.04	2,100
4	Hearne	Duesenberg	2:27:48.03	101.52	1,500
5	Haines	Mercer	2:30:56.43	99.39	1,000
6	Henderson	Duesenberg	2:33:07.95	98.09	1,000
7	Lewis	Hoskins	2:35:08.07	97.60	800
8	Vail	Hudson	2:39:03.00	94.31	800
9	L. Chevrolet	Frontenac	2:40:08.86	93.67	600
10	Fontaine	Mercedes	2:42:23.90	92.63	500
11	De Palma	Packard	2:42:08.46	91.95	

*Includes special prizes.

Also started—Buzane, Detroit Special; Thomas, Mercer; Milton, Duesenberg; Devigne, Delage; Taylor, Newman-Stutz; Patterson, Hudson; Henning, Ogren; Alley, Pan-American; Boyer, Frontenac; Lecain, Delage; Oldfield, Golden Egg; Toft, Omar; Mason, Ogren; Schillo, Mercer; Burt, Delage; Dietrich, Erbes.

OMAHA, 50-MILE RACE, JULY 4

Order	Driver	Car	Time	M.P.H.	Purse
1	Lewis	Hoskins	29:03.00	102.85	\$ 1,000
2	Mulford	Hudson	30:12.45	99.31	500
3	Milton	Duesenberg	30:14.10	99.22	300
4	Henderson	Duesenberg	30:14.50	99.20	200
5	Taylor	Hudson	30:14.85	99.18	

Also started—Hearne, Duesenberg; Burt, Miller; Mason, Ogren; Toft, Omar; L. Chevrolet, Frontenac.

OMAHA DERBY, 150 MILES, JULY 4

Order	Driver	Car	Time	M.P.H.	Purse
1	Mulford	Hudson	1:28:53.00	101.4	\$ 3,550
2	Milton	Duesenberg	1:29:57.07	100.05	1,700
3	Thomas	Mercer	1:30:18.20	99.66	1,000
4	Hearne	Duesenberg	1:31:21.28	98.52	800
5	Taylor	Hudson	1:31:27.69	98.41	700
6	Haines	Mercer	1:31:36.28	98.25	500
7	Lewis	Hoskins	1:34:35.69	95.16	300
8	Burt	Miller	1:37:44.60	92.40	

Also started—L. Chevrolet, Frontenac; Kirkpatrick, Frontenac; Mason, Ogren; Toft, Omar; Henderson, Duesenberg; Alley, Pan-American; McBride, Olsen.

*Includes special prizes.

UNIONTOWN MATCH RACE, JULY 4, THREE HEATS

Order	Driver	Car	Time	M.P.H.	Purse
1	Boyer	Frontenac			5
2	Vail	Hudson			6
3	Cooper	Stutz			9
4	Fontaine	Mercedes			10

*Penalties.

TACOMA, 150-MILE RACE, JULY 4

Order	Driver	Car	Time	M.P.H.	Purse
1	Patterson	Hudson	1:41:09.1	88.97	\$ 1,800
2	Durant	Chevrolet	1:42:59.1	87.37	1,200
3	Rhodes	Hudson	1:52:19.0	80.14	800
4	Malcolm	Hudson	1:55:02.0	78.24	500

Also started—Parsons, Seattle Special; Bales, Majestic Special; Hanson, Hudson; Price, Duesenberg; Latta, Romano Special; Crosby, Duesenberg.

MINNEAPOLIS, 100-MILE RACE, JULY 14

Order	Driver	Car	Time	M.P.H.	Purse
1	Vail	Hudson	1:02:19.73	96.28	None
2	Lewis	Hoskins	1:03:34.68	94.38	None
3	Dutton	Stutz	1:03:35.06	94.36	None
4	Salles	Frontenac	1:04:46.17	92.64	None
5	Mulford	Hudson	1:06:13.07	90.61	None
6	Taylor	Hudson	1:07:20.30	89.10	None
7	Cadwell	Miller	1:08:07.20	88.03	None
8	Milton	Duesenberg	1:08:27.85	88.637	None
9	Henderson	Duesenberg	1:08:28.00	88.633	None

Running at the finish—Mason, Ogren; Toft, Omar. Also started—Hearne, Duesenberg; McBride, Olsen; L. Chevrolet, Frontenac; Fontaine, Mercedes; Haibe, Ogren.

MINNEAPOLIS, 50-MILE RACE, JULY 14

Order	Driver	Car	Time	M.P.H.	Purse
1	Dutton	Stutz	30:50.91	97.27	None
2	Mulford	Hudson	32:32.26	92.21	None
3	Vail	Hudson	32:47.06	91.50	None
4	Taylor	Hudson	33:03.81	90.74	None
5	Henderson	Duesenberg	33:25.15	89.39	None

Also started—Lewis, Hoskins; L. Chevrolet, Frontenac; Milton, Duesenberg; McBride, Olsen; Mason, Ogren; Toft, Omar.

SHEEPSHEAD BAY, MATCH RACE, AUGUST 18, THREE HEATS—20, 30 AND 50 MILES

Heat	Driver	Car	Time	M.P.H.	Purse
1	De Palma	Packard	10:58.8	110.1	\$15,000
2	De Palma	Packard	16:35.6	108.5	
3	De Palma	Packard	27:32.2	108.9	

Oldfield used two cars, the Delage and the Golden Egg, taking second money, \$7,500. Louis Chevrolet, Frontenac, took third prize, \$2,500.

CHICAGO SPEEDWAY RACE, 20 MILES, SEPT. 3

Order	Driver	Car	Time	M.P.H.	Purse
1	De Palma	Packard	11:02.07	108.7	
2	G. Chevrolet	Frontenac	11:02.40	108.6	
3	Lewis	Hoskins	11:17.12	106.3	
4	Alley	Pan-American	11:30.65	104.2	

RECORD OF DRIVERS IN 1917 RACES

Driver	Starts	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Un.
Mason	7	0	0	0	0	0	0	0	0	0	0	6
Schillo	1	0	0	0	0	0	0	0	0	0	0	1
Dietrich	1	0	0	0	0	0	0	0	0	0	0	1
Kirkpatrick	1	0	0	0	0	0	0	0	0	0	0	1
Rhodes	1	0	0	1	0	0	0	0	0	0	0	0
Malcolm	1	0	0	0	0	0	0	0	0	0	0	1
Parsons	1	0	0	0	0	0	0	0	0	0	0	1
Bales	1	0	0	0	0	0	0	0	0	0	0	1
Hanson	1	0	0	0	0	0	0	0	0	0	0	1
Price	1	0	0	0	0	0	0	0	0	0	0	1
Latta	1	0	0	0	0	0	0	0	0	0	0	1
Crosby	2	0	0	0	0	0	0	0	0	0	0	2
Dutton	2	1	0	1	0	0	0	0	0	0	0	0
Sarles	1	0	0	0	1	0	0	0	0	0	0	0
Cadwell	1	0	0	0	0	0	0	0	0	0	0	0
Haibe	4	0	0	0	0	0	0	0	0	0	0	4
Trekus	6	0	0	0	1	0	1	1	0	0	0	3
Moosle	1	0	0	0	1	0	0	0	0	0	0	0
Elliott	4	1	0	0	0	0	0	1	0	0	0	2
Hickey	2	0	0	0	0	1	1	0	0	0	0	0
Resta	1	0	0	0	0	0	0	0	0	0	0	1
Anderson	4	0	1	0	0	1	0	0	0	0	0	2
Ford	1	0	0	0	0	0	0	0	0	0	0	1
McCarthy	3	2	0	0	0	0	0	0	0	0	0	1
Conway	2	0	1	0	0	0	0	0	0	0	0	1
Shoff	2	0	0	1	0	0	0	0	0	0	0	1
N. Fetterman	2	0	0	0	1	0	0	0	0	0	0	1
I. P. Fetterman	1	0	0	1	0	0	0	0	0	0	0	0
Benedict	1	0	0	0	0	0	0	0	0	1	0	0
Lamb	1	0	0	0	0	0	0	0	0	0	0	1
Newgard	1	0	0	0	0	0	0	0	0	0	0	1
Muller	1	0	0	0	0	0	0	0	0	0	0	1
Suckert	1	0	0	0	0	0	0	0	0	0	0	1

fourth with \$10,800, Vail fifth with \$10,150, and Tommy Milton sixth with \$9,150. Most of Mulford's winnings were made in the Hudson, although when Hudson withdrew in midsummer, Ralph took one of the Frontenacs and placed it several times.

Two drivers whose names never had been listed among the winners in a race review much be scheduled this year, but by a strange twist of Fate neither won money for their efforts. Ira Vail pushed his Hudson across the tape at Minneapolis ahead of the field last July, but this was a driver-promoted contest and the handful of spectators did not put enough money into the coffers to defray expenses, hence Vail won honor and glory only. His speed of 96.28 m.p.h. was the fastest ever made on the Fort Snelling course. Likewise, Tom Alley, whose experience has been that of a follower instead of a leader and who has figured in numerous wrecks and accidents, always emerging little the worse for wear, climbed over the top at Chicago and won

RACE RECORDS OF THE 1917 SEASON

5	Mason	Ogren	12:38.39	94.9	\$46.41
6	Henderson	Duesenberg	11:50.23	101.3	
7	Trekus	Olsen	15:05.58	79.4	

Also started—L. Chevrolet, Frontenac.

CHICAGO SPEEDWAY RACE, 50 MILES, SEPT. 3

Order	Driver	Car	Time	M.P.H.	Purse
1	De Palma	Packard	28:09.38	106.5	
2	Lewis	Hoskins	28:24.65	105.5	
3	G. Chevrolet	Frontenac	29:16.01	102.5	\$355.41
4	Henderson	Duesenberg	29:41.22	101.0	
5	Alley	Pan-American	30:02.68	99.8	

Also started—Mason, Ogren; Trekus, Olsen.

CHICAGO SPEEDWAY, 100 MILES, SEPT. 3

Order	Driver	Car	Time	M.P.H.	Purse
1	L. Chevrolet	Frontenac	56:29.50	106.2	\$ 983.48
2	Lewis	Hoskins	56:55.81	105.1	907.06
3	De Palma	Packard	57:36.16	104.1	1,134.83
4	Henderson	Duesenberg	59:43.72	100.4	456.84
5	Alley	Pan-American	1:30:35.37	66.2	389.35
6	Trekus	Olsen	1:34:07.37	63.7	211.86

*The drivers' percentage of the gate for all three races was \$4,420.40. Points were awarded in each event and the money spread over all three.

TACOMA, ARMY POST SPECIAL, 100 MILES, SEPT. 3

Order	Driver	Car	Time	M.P.H.	Purse
1	Cooper	Stutz			\$1,000
2	Durant	Chevrolet			800
3	Patterson	Hudson			500
4	Moosle	Duesenberg			200

Also started—Crosby, Duesenberg.

ARMY AND NAVY SWEEPSTAKES, UNIONTOWN, PA., SEPT. 3, 112 1/2 MILES

Order	Driver	Car	Time	M.P.H.	Purse
1	Elliott	Delage	1:14:25.96	90.70	\$ 2,500
2	Meyer	Pugh	1:15:38.49	83.24	1,250
3	Burt	Erbes	1:20:14.20	84.13	750
4	Haibe	Paic	1:22:28.20	81.85	500
5	Ewan	Crawford	1:28:49.20	75.99	350
6	Monahan	Johnson	1:30:21.25	74.65	

Also started—Oldfield, Golden Egg; Boyer, Frontenac.

PROVIDENCE, R. I., 100-MILE RACE, SEPT. 15

Order	Driver	Car	Time	M.P.H.	Purse
1	Milton	Duesenberg	1:24:42.23	70.84	\$ 3,000
2	Vail	Hudson	1:24:44.28	70.81	1,600
3	Hearne	Duesenberg	1:25:31.35	70.16	1,000
4	Lewis	Hoskins	1:27:36.32	68.49	800
5	Meyer	Pugh	1:29:56.50	66.92	600
6	Henderson	Duesenberg	1:31:56.38	65.26	500
7	Elliott	Delage	1:32:09.03	65.11	300
8	L. Chevrolet	Frontenac	1:34:15.15	63.66	200

Also started—Boyer, Frontenac; Mulford, Frontenac.

PROVIDENCE, R. I., 25-MILE RACE, SEPT. 15

Order	Driver	Car	Time	M.P.H.	Purse
1	Milton	Duesenberg	19:46.29	75.86	\$ 1,000
2	Vail	Hudson	20:07.55	74.53	500
3	L. Chevrolet	Frontenac	20:22.22	73.77	250
4	Hearne	Duesenberg	20:28.52	73.26	150
5	Meyer	Pugh	21:47.88	68.99	100

Also started—Elliott, Delage; Boyer, Frontenac; Mulford, Frontenac; Henderson; Duesenberg; Trekus, Olsen.

PROVIDENCE, R. I., 5-MILE RACE

Order	Driver	Car	Time	M.P.H.	Purse
1	Mulford	Frontenac	3:58.83	75.37	\$ 200
2	L. Chevrolet	Frontenac	3:59.30	75.29	150
3	Milton	Duesenberg	3:59.40	75.28	100
4	Boyer	Frontenac	4:00.30	74.90	50

Also started—Elliott, Delage; Trekus, Olsen; Lamb, Krueger; Meyer, Pugh; Haibe, Paic.

HARNESS TROPHY RACE, 100 MILES, NEW YORK, SEPT. 22

Order	Driver	Car	Time	M.P.H.	Purse
1	L. Chevrolet	Frontenac	54:20.98	110.4	\$ 1,250
2	De Palma	Packard	56:18.40	106.5	700
3	Hearne	Duesenberg	56:41.15	105.84	400
4	Mulford	Frontenac	56:41.40	105.83	200
5	Vail	Hudson	56:41.87	105.81	100
6	Hickey	Hudson	1:00:39.70	98.92	
7	Henning	Mercer	1:00:48.85	98.68	
8	Milton	Duesenberg	1:00:55.20	98.49	
9	Benedict	Benedict	1:01:42.80	97.24	

Also started—Resta, Frontenac; Henderson, Duesenberg; Devigne, Delage; Lecain, Delage; Haibe, Haibe; Boyer, Frontenac; Alley, Pan-American.

CHICAGO SPEEDWAY, 20 MILES, OCT. 15

Order	Driver	Car	Time	M.P.H.	Purse
1	Alley	Pan-American	11:22.10	105.56	None
2	G. Chevrolet	Frontenac	11:22.28	105.54	None
3	Mulford	Frontenac	11:22.43	105.50	None
4	Lewis	Hoskins	11:22.60	105.18	None
5	Anderson	Miller	11:27.35	104.77	None

Also started—Milton, Duesenberg; Henderson, Roamer; Ford, Delage.

CHICAGO SPEEDWAY, 50 MILES, OCT. 15

Order	Driver	Car	Time	M.P.H.	Purse
1	Mulford	Frontenac	28:18.75	105.96	None
2	Anderson	Miller	28:18.90	105.95	None
3	Alley	Pan-American	28:18.95	105.94	None
4	Milton	Duesenberg	28:19.20	105.93	None
5	Lewis	Hoskins	28:19.25	105.92	None

Also started—G. Chevrolet, Frontenac.

CHICAGO SPEEDWAY, 50 MILES, OCT. 15

Order	Driver	Car	Time	M.P.H.	Purse
1	Henderson	Roamer	27:22.21	109.62	None
2	Mulford	Frontenac	27:27.27	109.32	None

Also started—Alley, Pan-American; Milton, Duesenberg; Lewis, Hoskins; Anderson, Miller.

*Drivers got guarantee but gate did not cover it; no money to divide.

UNIONTOWN, PA., AUTUMN CLASSIC, 168 1/2 MILES, OCT. 29

Order	Driver	Car	Time	M.P.H.	Purse
1	Hearne	Duesenberg	1:49:02.45	92.73	\$ 3,000
2	Milton	Duesenberg	1:49:27.45	92.71	1,600
3	Vail	Hudson	1:54:37.05	88.21	1,000
4	Lewis	Hoskins	1:55:24.03	87.61	800
5	Hickey	Hudson	1:56:58.11	86.43	600

Also started—Henderson, Duesenberg; G. Chevrolet, Frontenac; Mulford, Frontenac; Anderson, Miller; Newgard, Johnson; Haibe, Paic; McCarthy, Hudson; Burt, Erbes; Meyer, Pugh; Boyer, Frontenac; Miller, Lawrence; Shoff, Haynes; Conway, Hudson; Ewan, Crawford; N. P. Fetterman, Haynes; Suckert, Olsen.

UNIONTOWN, CONSOLATION RACE, 56 1/4 MILES, OCT. 29

Order	Driver	Car	Time	M.P.H.	Purse
1	McCarthy	Hudson	38:20.18	88.04	\$ 600
2	Conway	Hudson	38:20.75	88.03	500
3	Shoff	Haynes	42:39.58	79.12	400
4	N. P. Fetterman	Haynes	43:43.49	77.20	300

Also started—Ewan, Crawford.

U. S. A. CHALLENGE TROPHY RACE, UNIONTOWN, PA., 56 1/4 MILES, OCT. 29

Order	Driver	Car	Time	M.P.H.	Purse
1	McCarthy	Hudson	36:12.61	93.21	Cup
2	Lewis	Hoskins	36:16.79	93.04	Cup
3	I. P. Fetterman	Peerless	36:48.34	91.72	Cup

the 20-mile event at 105.56 m.p.h. in the Pan-American, but there was no purse to divide as spectators were lacking.

Not one race driver's obituary notice has been necessary this year so far as those who have contended in this year's events are concerned. There have been numerous accidents but no fatalities among the drivers. This is an enviable record and one not common heretofore.

Two Fiats were to have been brought over from Italy for this season, arrangements for them having been made by W. F. Bradley, MOTOR AGE's special correspondent with the Allied armies, but when the cable reached Italy that Indianapolis had withdrawn, these two cars, then ready for shipment, were recalled. Resta, champion of last year, did not renew his contract with Peugeot, nor did his car appear this year. He came out of retirement in September and started one of the Frontenacs at Sheephead Bay but went out early in the race.

Every year we look for the Big Four in speedway racing. In 1917 it was Resta, Aitken, Rickenbacher and de Palma; this year, Mulford, Louis Chevrolet and Cooper displace three of last year's four, de Palma being the only hold-over. Resta entered just one race this year. Baron Rick went to France as chauffeur for General Pershing but is now an officer in the aviation corps in France. Johnny Aitken kept his faith with the Indianapolis speedway and did not enter a race this year.

Old Interest Lacking

The interest that in the good old days of melodrama was displayed when here or villain triumphed, that enthusiasm that marks the nose-to-nose dash of thoroughbreds to the wire, that tenseness of nerves that comes with two out and the bases full in a ninth-inning tie in a world's series, all of which has been crystallized in racing events of the past, never reached the semblance of crystallization in 1917. It was a lethargic crowd at best. There is something about a mammoth crowd that overflows grandstand and paddock that makes the thrill of a 100-mile-an-hour sprint between rival drivers get into one's marrow, but a meager crowd never can promote enthusiasm. It is too much like a baseball team trying to play with only half its members present.

Again New York takes the honors of the fastest race of the year, Louis Chevrolet bringing his Frontenac around the fifty laps to the tune of 110.4 m.p.h. in September. Twelve of the twenty-six races this year were won at better than 100 m.p.h.

Ten drivers—Taylor, Boyer, Hearne, Lewis, Vail, Patterson, Henderson, Alley, Dutton and Elliott—each won a first this year. Milton and McCarthy each took two firsts.

Enough of individuals; let us look at things mechanical. First place went to Frontenacs six times, to Hudsons five times; to Stutz, four; to Packard and Duesenberg, three each; with the Newman-Stutz, Hoskins, Delage, Pan-American and Roamer qualifying with one first each. Frontenac led with forty-one starts, Duesenberg was second with thirty-nine and Hudson third with thirty-four. Of the Frontenacs' forty-one starts, they failed to place nineteen times, leaving a net of

twenty-two times placed. Duesenbergs were unplaced twelve times in thirty-nine starts, which puts twenty-seven times placed to their credit. Hudsons have twenty-nine times placed to their credit out of thirty-four starts. Out of seven starts Cooper's Stutz always won place, never being below sixth.

Thirty-five different makes of cars faced the starter at various times during the season and sixty-seven drivers are found on this year's roll.

The epidemic of speedway building that prevailed a year or two ago seems to have waned, no newcomers having appeared in 1917, although Philadelphia and Columbus, Ohio, each are building tracks to be ready next year, if present plans materialize.

Neither Peugeots, Maxwells, Sunbeams nor Premiers were seen on the tracks this year, nor were there any new ones, with the exception of the Hudsons, de Palma's Packard, Oldfield's Golden Egg, the Roamer, the Miller and the Pan-American.

Gil Anderson, who was laid up many months with a broken leg sustained at Cincinnati's initial race on Labor Day of last year, came back at the wheel of a Miller that showed real speed at Chicago in October. It is possible Gil will pilot this car next year.

As a finale to a season of racing that has been anything but successful from a financial standpoint, there is a movement on foot to organize racing drivers into a body, the officials of which will attempt to keep a large field of cars and drivers intact and insure to the speedways adequate drawing cards for next year's races. The list of names which the promoters are circulating as an evidence of their efforts to bring the drivers into the new organization does not include the names of such drivers as one usually goes to a race to see. It is rumored de Palma, Oldfield, Louis Chevrolet, Mulford and some others in this category have promised to affix their names to contracts, but whether they do or not remains to be seen.

SUMMARY OF SEVEN YEARS OF SPEEDWAY RACING

Year	Race	Dist.	Start-ers	Fin-ish-ers	Winning car and driver	M.P.H.
1911	Indianapolis	500	38	12	Marmon, Harroun	74.59
1912	Indianapolis	500	22	10	National, Dawson	78.70
1913	Indianapolis	500	27	10	Peugeot, Gouz	76.92
1914	Sioux City	300	17	9	Duesenberg, Rickenbacher	78.60
1914	Tacoma Montamarathon	250	14	5	Stutz, Earl Cooper	73.44
1914	Tacoma Potlatch	200	14	6	Maxwell, Hughes	74.28
1914	Tacoma Intercity	100	11	6	Frantz, Parsons	73.60
1915	Indianapolis	500	24	11	Mercedes, De Palma	89.84
1915	Chicago	500	21	12	Peugeot, Resta	97.58
1915	Sioux City	300	15	6	Maxwell, Rickenbacher	74.70
1915	Omaha	302	8	4	Maxwell, Rickenbacher	91.74
1915	Tacoma Montamarathon	250	13	5	Mercer, Ruckstell	84.80
1915	Tacoma Potlatch	200	8	4	Mercer, Pullen	85.00
1915	Tacoma Intercity	100	10	5	Parsons Special, Parsons	79.50
1915	Des Moines	300	11	8	Duesenberg, Mulford	87.00
1915	Twin City	500	14	6	Stutz, Earl Cooper	86.35
1915	Providence	100	14	8	Maxwell, Rickenbacher	67.11
1915	New York	350	20	6	Stutz, Anderson	102.56
1915	Chicago	100	4	3	Peugeot, Resta	101.86
1915	New York	100	6	3	Peugeot, Resta	105.30
1915	Providence	25	8	4	Peugeot, Burman	69.76
1916	New York	20	13	5	Peugeot, Aitken	106.71
1916	New York	50	9	4	Peugeot, Mulford	104.34
1916	New York	150	10	5	Maxwell, Rickenbacher	96.53
1916	Indianapolis	300	21	10	Peugeot, Resta	84.05
1916	Chicago	300	21	10	Peugeot, Resta	98.61
1916	Des Moines	150	9	7	Mercedes, De Palma	92.60
1916	Twin City	150	14	7	Mercedes, De Palma	91.08
1916	Sioux City	10	10	6	Duesenberg, D'Alene	79.60
1916	Sioux City	20	12	8	Premier, Wilcox	78.40
1916	Sioux City	50	15	8	Premier, Wilcox	72.57
1916	Omaha	50	8	5	Mercedes, De Palma	103.45
1916	Omaha	150	17	5	Peugeot, Da Resta	99.02
1916	Kansas City	100	12	4	Mercedes, De Palma	58.48
1916	Tacoma Montamarathon	300	14	6	Maxwell, Rickenbacher	89.30
1916	Chicago	50	8	5	Peugeot, Resta	100.42
1916	Cincinnati	300	28	6	Peugeot, Aitken	97.06
1916	Indianapolis	20	10	4	Peugeot, Aitken	95.08
1916	Indianapolis	50	9	5	Peugeot, Aitken	91.83
1916	Indianapolis	100	12	7	Peugeot, Aitken	89.44
1916	New York	250	31	10	Peugeot, Aitken	104.83
1916	Chicago	250	19	10	Peugeot, Resta	103.99
1916	New York	100	21	6	Peugeot, Aitken	105.95
1916	New York	50	11	5	DeLage, Lecain	101.20
1916	Vanderbilt	294	17	4	Peugeot, Resta	86.98
1916	Grand Prize	403	20	4	Peugeot, Wilcox-Aitken	85.59
1916	Ascot	150	12	4	Duesenberg, Rickenbacher	67.54
1916	Uniontown	112	7	5	Frontenac, Chevrolet	90.69
1917	Ascot	100	12	3	Stutz, Cooper	68.36
1917	Uniontown	112	15	12	Newman, Stutz-Taylor	89.25
1917	Cincinnati	250	28	11	Frontenac, L. Chevrolet	102.18
1917	Chicago	250	27	11	Stutz, Cooper	103.15
1917	Omaha	150	15	8	Hudson, Mulford	101.40
1917	Omaha	50	10	5	Hoskins, Lewis	102.85
1917	Tacoma	150	10	4	Hudson, Patterson	88.87
1917	Twin City	100	16	9	Hudson, Vail	96.28
1917	Minneapolis	50	11	5	Stutz, Dutton	97.27
1917	New York	100	3	3	Packard, De Palma	109.01
1917	Chicago	20	8	7	Packard, De Palma	103.70
1917	Chicago	50	7	5	Packard, De Palma	*106.50
1917	Chicago	100	6	6	Frontenac, L. Chevrolet	106.00
1917	Tacoma	100	5	4	Stutz, Cooper	90.70
1917	Uniontown	112	8	6	DeLage, Elliott	70.84
1917	Providence	100	14	8	Duesenberg, Milton	75.86
1917	Providence	25	10	5	Duesenberg, Milton	75.37
1917	Providence	5	9	4	Frontenac, Mulford	110.40
1917	New York	100	16	10	Frontenac, L. Chevrolet	105.66
1917	Chicago	20	8	5	Pan-American, Alley	105.96
1917	Chicago	50	6	5	Frontenac, Mulford	103.62
1917	Chicago	50	6	2	Roamer, Henderson	92.73
1917	Uniontown	168	21	5	Duesenberg, Hearne	88.04
1917	Uniontown	56	5	4	Hudson, McCarthy	93.21
1917	Uniontown	56	3	3	Hudson, McCarthy	

*Average for three heats.

Show Your Patriotism—Help Save the Food

Test U. S. War Trucks

Steady Grind on Roads Shows Vehicles Best in War or Peace

Heavy Grades Are Climbed Without the Least Difficulty

WASHINGTON, Nov. 12—Commencing this week, the first two heavy-duty war trucks, designed and constructed under the direction of General Chauncey B. Baker of the Quartermaster's Corps in collaboration with the Society of Automotive Engineers, will operate steady grinding road tests in continuous runs of 18 hr. a day with two shifts of drivers. These tests will continue for at least a month, under the direction of H. F. Thomson of the Massachusetts Institute of Technology.

Tests made recently prove without doubt that the new trucks have greater power and capabilities than any trucks ever built for war or commercial purposes. The last two weeks have been devoted to numerous short and varied tests at points in and near Washington. The first tests, made without modifications or experiments with minor parts, were near Fort Myer, where the trucks were run over heavy clay hills where in many instances the ground caved in under the wheels. The trucks were at no time in difficulty and at every point escaped from cave-ins and mud ditches either in forward or reverse power.

The next tests taking place on the grounds at Fort Myer were made in a special ditch used for testing purposes and which is 4 ft. deep and 7 ft. wide. The trucks ran into the ditch on one side and climbed up and out on the other side without difficulty despite the fact that the full load which the truck carried shifted to the rear on the upward climb, adding considerably to the actual weight.

At Georgetown a heavy-going ditch 15 ft. long with a 25 per cent grade precedes a hill at 19 per cent grade, forcing all vehicles to the lowest running speed before they reach the 19 per cent climb. The truck made the 19 per cent hill on second speed without use of low speed and carried the full rated load—a feat that caused General Baker to call the truck the most powerful on earth.

The trucks originally used 36-in. wheels and a week ago one ran on its power to Philadelphia to get the first set of 40-in. wheels for test. On the return trip, which was made in 13 hr., the truck, using the 40-in. wheels, passed through a detour of heavy mud and aided many touring cars and other trucks stalled in the almost impassable road. The 40-in. wheels have been found better than the 36-in. size. They provide greater speed and firmer traction.

WANTED: WAR ROADS!

Chicago, Nov. 12—One more practical demonstration of the need of war roads urged from time to time by MOTOR AGE

has been made. This is concerning the road that leads to Camp Grant, the cantonment situated at Rockford, Ill. For some time, while the weather was wet and otherwise disagreeable, the soldiers had been looking forward to a few days of sun when the roads would dry up and they could get off the muddy drilling grounds and take to the road. For four days the sun shone but still the roads around the cantonment remained muddy. One of the largest paving firms in America has offered its organization, tools and equipment to the Government for repair of the road mentioned. There are 27,000 men at Camp Grant. Weeks of training will be lost, they say, unless the roads are made solid. But those in authority say it is up to Uncle Sam.

U. S. UNITS GO OVERLAND

Washington, Nov. 10—The movement towards overland travel for motor driven apparatus as an aid to the movement to conserve the transportation facilities of the railway lines is being encouraged by different branches of the Government, and announcement now is made that four hospital companies and four field hospitals from the medical training camp at Fort Benjamin Harrison, Indiana, will go overland to Fort Oglethorpe, Ga. Two of the ambulance companies and two of the hospital units will be motor driven.

COMMANDEERS MACHINE TOOLS

New York, Nov. 10—Six hundred machine tools, valued at \$10,000,000, were commandeered last week by the Government through its machine tool section of the War Industries Board. They were taken from warehouses at various seaports. Some of them were stored for over a year and were destined for Sweden. Some of these machine tools have been turned over to the Simplex Automobile Co., which has started work on its order for 4000 Hispano-Suiza engines for the Aircraft Production Board.

URGES REMOVAL OF DUTIES

Montreal, Ont., Nov. 9—The Province of Manitoba food control committee has recommended to the Government the removal of customs duties on agricultural implements, farm machinery and low-priced motor cars. The recommendation is based on the serious food shortage throughout the world and the fact that the government has urged the western farmer to produce the largest possible crop of wheat in 1918. It is believed that the removal of duties on these articles which retail at \$1,000 or less will greatly aid in increasing production.

COLE SUPPLIES OFFICERS CARS

Indianapolis, Ind., Nov. 9—The Cole Motor Car Co. has obtained a Government contract for cars for the use of army officers. The cars are to be of the four-door Toursedan type, finished in olive drab with black leather upholstery, with special lighting and heating features.

Car Trade Inconsistent

Phenomenal Demand in South and Slack in New England and on Coasts

Freight Situation Continues to Delay Delivery to Dealers

DETROIT, Nov. 10—The various factories report that as a whole the central, western and southern parts of the country show a continued demand for cars that is almost normal for this time of the year. It is the New England, eastern and western coast sections that seem most unsettled, and it is in these sections that the war tax, the Liberty bond issue and war conditions in general seem to have had the most effect.

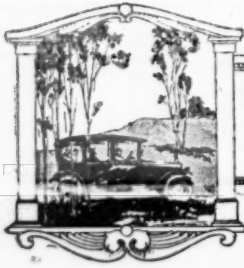
In the South the recent demand for light cars, particularly light used cars, has been phenomenal, and the Detroit dealers in used cars are daily making shipments to southern stations that bid fair to clear this market of used Fords. One used car dealer has shipped four carloads of six Fords each in the last two weeks, and has a contract to ship twenty carloads by Christmas. Four carloads have been shipped to Knoxville, Tenn., one to Macon, Ga., one to Locust Grove, Ga., and one to Charleston, S. C., in the same time.

Reo reports that it did a larger volume of business in October this year than last year, but that some difficulty is being experienced in obtaining cars for shipment. Olds Motor states that though the demand for cars is less than it was in the spring, materials and not demand is the limiting factor in production.

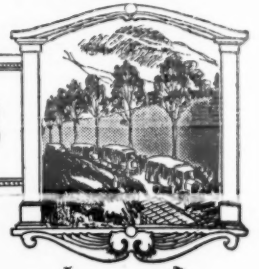
Material Situation Bad

The Government's further schedule of fixed steel prices has tended to a certain extent to relieve the pressure on the material situation, but in spite of this the material situation is bad. Alloy steels are practically unavailable, and the priority ruling permitting plants doing Government work to get first chance at necessary materials compounds matters. One plant in Detroit, having a 600-car a day capacity and recently working on a 400-car a day schedule, has had to cut down its output to about 250 a day, because of inability to get fenders.

If such a thing is possible, the freight car situation is worse now than it has been for some time. The priority board has restricted the use of open freight cars, except flat cars, for motor car shipment, and in some instances, cars loaded with motor cars have been unloaded for Government use. Driveways have relieved the pressure somewhat, and the lake routes are offering another outlet for the present. During the first four days of this week, one line alone carried an average of sixty machines a day to Toledo, where they were distributed overland to Ohio, Indiana and Illinois dealers. One company alone is shipping thirty-five cars daily by this route.



EDITORIAL PERSPECTIVES



Your Car Can Help Win the War

"The Spirit with which our soldiers leave America, and their efficiency on the battle fronts of Europe, will be vitally affected by the character of the environment surrounding our military camps."—President Wilson.

YOU can arrange to utilize that unoccupied seat in your car by taking some of our soldier and sailor boys out for a ride—perhaps stopping at your own home for dinner. An article on another page tells how this is being done by many motorists. The flower of America's young manhood is in intensive training at nearly a hundred camps in this country for the Army and Navy and the Marine and Aviation Corps.



NO fighting force in the world's history has been so representative of the noblest in Democracy; and it must be afforded every opportunity—surrounded with every environment that stimulates the finest patriotism. If we who stay at home were to do less, we would commit an unspeakable folly. This force must be made the best in every respect the world has ever seen. This can be accomplished if every person in the United States will do his part.

Spirit—Not Numbers—Counts

THE spirit of the American Army must be made in the few months the boys are in training. Mere numbers do not make an army, millions of soldiers who lack the fighting spirit can retreat without a struggle. The American boys must know that the finest ideals of civilization are in their hands, that the folks at home are fighting in their hearts. One of the biggest things to be done is to replace in their leisure hours some of the social activities they gave up when they joined the colors. Among the agencies working toward this end are the Y. M. C. A., Knights of Columbus and the American Library Association.

The Pressed-On Tire

FOR a time, when the Quartermaster's Department at Washington wanted to write into the specifications of the standardized war truck demountable solid rubber tires, it looked as if the pendulum of tire progress was going to swing backward, but fortunately the specifications were changed and now Washington is in step with the industry in the belief that the pressed-on solid rubber tire is best for the motor truck. Europe always has stood for the pressed-on tire, and for nearly three years there has been an unmistakable trend in America toward its more general use. It gives a more rigid fastening for the tire and consequently is expected to give longer life. The wheel weight is considerably lighter, particularly at the periphery, which is always a desirable factor in any vehicle where acceleration and retardation follow each other so rapidly as in car or truck work.

IN addition the War and Navy Departments have created the Commission in Training Camp Activities, a part of which is the War Camp Community Recreation Fund of which John N. Willys is committee chairman. Its purposes are:

To bring war camp and the adjacent community into open-hearted normal contact.

To have the American citizen-soldier welcomed everywhere.

To provide happy, healthy recreation and social activity outside the camp in the surrounding section for all the men in uniform.

"Mollycoddling?"

"BUT, do the soldiers like coddling?" NO. "Do they resent any suggestion that they need, more than other youths, to be safeguarded?" YES. If there were any patronizing or goody-goodness or compulsion, or high-browedness in our War Camp Community Recreation Fund, these red-blooded young troopers would not turn to it so eagerly.



FOR instance:—One soldier volunteers to go with a motor car owner to pick up boys who are wandering along the city's white way on Saturday night, not knowing what to do with their hours of freedom. The first car comes back with eighteen lads clinging to it. Only fifteen are crowded on the next car; seventeen on the third. They are redistributed comfortably into the cars which assemble each Saturday evening at the downtown khaki club to take the boys around the boulevards and parks. Do they want motor rides? Try the next soldier or sailor you pass with an empty seat in your car.

THE demountable solid rubber tire will continue to be used in small quantities in outlying sections where there are not the large presses needed in putting on and taking off the pressed-on types. There are many small towns where trucks are used but where there are not the large, heavy presses which are needed for the work of pressing on tires. In such outlying sections the demountable will continue to be used. The truck owner who buys the demountable truck tire with the thought that the driver and his assistant can change it on the road is under a misapprehension. He has forgotten to think out just where he will carry the huge extra tire. It is not so easy a job as on the passenger car. A truck cannot easily be fitted with a spare tire rim on its rear or side as the passenger car can be fitted. For these reasons then the pressed-on tire gives the truck owner better service.

Italian Car Plants Bustling

Motor Industry Centered at Turin—
All Plants at Capacity—Fiat Largest

TURIN, Italy, Sept. 16—Turin, Italy's most important motor car center, is a bustling place these days. Unlike the motor car factories of England and France, the various Italian motor car firms have been allowed to remain on the classes of work for which they were designed originally. Obviously the entire output is for military purposes, and therefore does not include the same number of touring cars as in peace days, but in no case does it appear that a motor factory has been converted from motor work to shells or other war material having no direct communication with the motor industry.

This point does not appear to have been appreciated in foreign motor circles, for the statement has been made that Italy is almost a negligible factor as a motor car producer. Quite the contrary is the case, for not only have the Italian factories been increased enormously in size—in common with the motor factories of all Allied nations—but they have remained motor factories. Thus the Italian factories have not only a greater car output than at any period of their history, but they have increased at a greater ratio than those of other Allied nations. It is not possible to predict how far this progress will continue in the future, for the demands of war may make it necessary to change the nature of the output of the motor car factories. Already, however, the Italian factories are reaping the benefit of the settled policy of the Government when they joined in the war, and they will continue to benefit.

23,000 Fiat Workers

It is not possible to obtain, or advisable to publish, absolutely accurate figures regarding the number of workers and the output of the Italian factories. The biggest concern is Fiat, with a staff of 23,000 workers, compared with 5000 in 1914. The other important factories are Lancia, Italia, Seat, Diatto, with Bianchi, Isotta-Fraschini and Züst at Milan, the combined staff of which barely exceed that of the Fiat company.

Quite recently the Italian military authorities issued a decree forbidding the use of motor cars for any but military purposes. This drastic action had to be taken, it was claimed, to assure the army receiving all the supplies of petrol needed for war purposes. For a considerable length of time motorists in Italy have been restricted in the amount of gasoline they could receive. Theoretically every car owner was entitled to 13 gal. a month, but more often than not dealers were unable to supply this, and the official slip proved valueless. As taxes had to be paid as usual there was discontent among car owners, who maintained that the Government should not levy a tax on an object that could not be used. Now that there is a definite order against the use of motor cars, owners have a stronger case than

ever, and doubtless will succeed in getting a repeal of the taxes so long as the interdiction lasts.

GRAND PRIZE AND VANDERBILT

New York, Nov. 10—The Grand Prize and Vanderbilt Cup races will be resumed, if the plans of Clarence Bennett of California go through. Mr. Bennett is planning to hold the two classics in April, 1918, and is negotiating with the Contest Board of the American Automobile Association and the Motor Cups Holding Association in regard to getting a sanction and permission to use the cups. San Antonio has been selected for the races. A 9-mile course will be used. The Grand Prize and Vanderbilt races were dropped last year, the previous races being held at Santa Monica in November, 1916. Resta was the winner of the Vanderbilt, and Wilcox and Aitken were the winners of the Grand Prize.

S. A. E. ANNOUNCES DATES

New York, Nov. 10—The Society of Automotive Engineers has announced dates of future meetings of the sections. The Metropolitan Section will hold a meeting Nov. 15 at the Automobile Club of America. Cleveland will hold its meeting Nov. 16; Pennsylvania, Nov. 22; Buffalo, Dec. 5, at the Statler Hotel; Mid-West Section, Nov. 23, at the Chicago Automobile Club. The Tractor Standards Committee will meet Dec. 5 at Minneapolis.

DETROIT-TOLEDO TRUCK TRAINS

Detroit, Nov. 12—Trucks running on a regular schedule between this city and Toledo are to be used to relieve the freight congestion which has been so marked for the last year. A corporation of Detroit business men is being formed to purchase a fleet of trucks and trailers that will be operated on a regular schedule. It is probable that there will be at least four trains each way consisting of 5-ton trucks and two 5-ton trailers and carrying a total tonnage of 120 tons.

The Michigan War Preparedness Board has voted the expenditure of \$35,000 for completion of the road between Detroit and Toledo. Monroe county will contribute \$15,000 for a temporary road for truck transit to be used while the permanent road is being rushed to completion.

DUNHAM IN MILITOR CONCERN

New York, Nov. 10—George W. Dunham, president of the Society of Automotive Engineers, has become vice-president of the Militor Co. of New York. This company will manufacture the Militor motorcycle, formerly known as the Militaire, which was exhibited at the national show here. A plant has been purchased at Elizabeth, N. J., where production will start soon. An annual output of 25,000 machines is being arranged for. The Militor has been developed and built at Buffalo.

In designing the Militor the engineers of this company entirely discarded the diamond frame idea and instead have followed motor car engineering practices. An unusual feature of the Militor construction consists of the two 8-in. idler wheels, one on each side of the rear wheel, which can be raised or lowered instantly by the driver by a slight pressure of the heel upon a conveniently placed lever. These idler wheels are stabilizers and make it possible to mount and dismount, to stop or start the car without requiring the agility of motorcycle riders.

PULLMAN DIFFICULTIES SETTLED

York, Pa., Nov. 10—L. Goldstein Sons and Michael Levy and his syndicate have come to terms over resumption of operations at the Pullman plant. The Goldsteins, owners of the Pullman franchise, trademark, good will, etc., are putting their resources behind the plant, and arrangements for a new plant are now in progress.

The new Pullman car is expected to be on exhibition soon. Michael Levy, New York, who, with Joseph Frankel, purchased the real estate, belongs to a New York syndicate, and it was by Levy's personal efforts that the lawsuit over the trademark, etc., started in Scranton, was brought to an amicable issue.

A \$3,000,000 concern is to handle the Pullman car. The Goldsteins own the American Motor Parts Co., American Motors Co., Marion Car Co., Herreshoff Motor Co., De Tamble Motor Co., L. P. C. Motor Co., Enger Motor Co., Bimel Motor Co., Alter Motor Co., and Pullman, with several mining and smelting concerns, which will enable them to furnish much of their own materials.

MAY HAVE TRACTOR SHOW

Chicago, Nov. 13—Possibilities of a tractor exhibition in Chicago were announced last night at a meeting of the directors of the National exposition for Ford accessories when it was decided to investigate the possibilities of staging a tractor show next fall. If it is decided to feature tractors in connection with the accessories exhibit the name will be changed to the Accessories Market.

Financial report of the First National Exposition for Ford accessories which was held at the Coliseum this fall showed that it made a profit but instead of declaring dividends the funds remaining after all bills were paid were held as working capital. The official report showed a total of over 50,000 admissions and \$2,000 taken in at the doors. Manager Beulow, who staged the show, this year has been retained for next season. The place has not been decided but will be either the Coliseum or the Dexter Park pavilion at the stock yards. The list of officers of the association remains the same except that I. P. Perry becomes first vice-president and L. P. Zinke becomes second vice-president.

Show Your Patriotism—Help Save the Food

Curtailment Is Delayed

Steel and Question of Passenger Car Production as Non-Essential Quieter

Representatives of Industry Are Making Investigation

WASHINGTON, D. C., Nov. 12—The steel problem and the question of passenger cars as non essentials during the war temporarily have quieted, while the new committee representing the motor car industry and J. F. Replogle, director of steel products for the Council of National Defense, make their investigations. The new committee, which consists of Hugh Chalmers for the National Automobile Chamber of Commerce; A. W. Copeland for the Motor and Accessory Manufacturers and John R. Lee for the Ford Motor Co., is starting an investigation to determine the idle capacities of motor car plants and to secure data relative to skilled workers, steel and other matters vital to the war.

Replogle Directs Steel

Mr. Replogle as director of steel products is passing upon all steel and iron orders for private concerns, the United States and its allies and will gather the statistics relative to the steel production, demands for steel made by the motor car makers, etc., and at a later date the committee will through the Automotive Products Section of the Council of National Defense, co-operate with Mr. Replogle and the War Industries Board to determine just what action will be taken regarding the curtailment of passenger car business and to learn just how seriously the passenger car business digs into the steel output.

The attitude taken by the War Industries Board in regarding the passenger car industry as a non-essential has aroused considerable discussion and provoked many viewpoints. The United States Chamber of Commerce, issuing several bulletins on the subject, points out several important problems. To determine the raw materials which must be imported, states the Chamber of Commerce bulletin, for war production in this country and for the maintenance of our essential industrial life involves what we are to produce for our Army and the extent to which normal industries are to go forward during these times and how far our raw material requirements can be met from our own production, which involves a discussion of the great problem of what are essential and what are non-essential industries during the war. Before a conclusion can be reached, the bulletin goes on, as to what constitutes a non-essential industry there must be known what is needed from abroad and what we will have to send in exchange, for what may be non-essential here may be productive of most important materials for the war by being sent abroad in exchange for essential materials. For example, it says, we need nitrate and copper from

Chile. We, however, may procure this nitrate and copper by shipping motor cars to Chile. Again, we need wool, wheat and hides from Argentina, and these necessities may be obtained by shipping limousines or typewriters in exchange. Thus, the manufacture of a limousine may be in fact the means of producing nitrate or wool. What may be shipped abroad, states the bulletin, depends on what foreign countries are willing to receive from us, and, therefore, it may be impossible to secure what we need unless we are able to ship what are termed non-essentials.

Another bulletin tells that the Chamber of Commerce is receiving inquiries from many sources as to what really constitutes a non-essential business and advises that no action except emergency be taken, except in accordance with a general plan based upon a thorough survey of industry. It adds that the motive of the Government, the concentration of industrial energy for winning the war, appeals to all, and every industry can be relied upon to assist in adjustment with war needs if they are given the opportunity to meet the needs in a gradual manner after deliberate planning, provided the need is actual. The Chamber of Commerce also points out that with careful planning the industry called non-essential can proceed with substitute materials or different methods of production.

Still Make Ford Cars

CHICAGO, Nov. 12—Ford owners throughout the country have been made needlessly alarmed by the report that Henry Ford would build no more passenger cars until the war is over. The report is untrue. The new United States regulations which will govern the manufacture of passenger cars will be observed by the Ford plant as well as by the other makers, but just what the ruling will be nobody knows just now, and meanwhile the manufacture of Ford passenger cars continues.

The Ford company is devoting a portion of its equipment to war materials but has not discontinued its regular output.

AGNEW WITH HUDSON CONCERN

Cleveland, Ohio, Nov. 9—W. L. Agnew, formerly director of advertising and publicity for Chalmers, is now vice-president and general manager of the F. E. Stuyvesant Motor Co., Hudson distributor. Mr. Agnew was advertising manager of the Hudson Motor Co. for four years before becoming director of advertising for Chalmers and resigned from the latter company when it was taken over by Maxwell.

S. K. PITTMAN DIES

Toledo, Ohio, Nov. 12—Samuel K. Pittman, assistant treasurer of the Willys-Overland Company, died Nov. 9. It is thought that worry over European war conditions was the immediate cause, though he had been in ill health a year. Mr. Pittman came to the Willys-Overland organization two years ago from the Detroit Steel Products Co., of which he had been treasurer. He leave a wife and four children.

A Chance for Mechanics

Ordnance Corps Wants Motor Car Drivers and Workers for War Service

To Care for Army Trucks, Tractors and Cars

CHICAGO, Nov. 12—Additional opportunity for motor car mechanics and drivers to go into service in lines where their experience will count most is offered in a bulletin sent out by the Ordnance Department from Washington. This bulletin comes from the office of the Chief of Ordnance of the War Department at Washington and is intended to increase enlistments of mechanics and drivers for the motor equipment section of the Ordnance Department. This branch of the service soon will have several thousand motor trucks, tractors and tanks, and a force of several thousand men will be necessary to drive these machines and keep them in repair.

This gives the man with mechanical experience an opportunity to serve his country in a position where his ability will be recognized. The man driving a truck or employing his mechanical knowledge to keep the motor vehicles in repair is doing his bit in just as important a way as the men in the trenches. The men who join now and show ability naturally will have the advantage in receiving promotion over those who join later. The fact that a man had been drafted or expects to be drafted does not prevent his enlistment or transfer to the motor section of the Ordnance Department, it is stated.

Enlistment blanks and full information can be obtained by addressing Motor Equipment Section, Carriage Division, 1703 New York avenue, N. W., Washington, D. C. Or readers can obtain blanks and information direct from MOTOR AGE.

RUESCHAW LEAVES REO

Lansing, Mich., Nov. 9—R. C. Rueschaw has resigned as sales manager of the Reo Motor Car Co. Forest H. Akers, assistant sales manager, will succeed him. Akers has been with the Reo company for several years, first as traveling district supervisor and later as assistant sales manager.

KANSAS OIL OUTPUT LARGER

Topeka, Kan., Nov. 9—A decision in the state supreme court permits the Standard Oil companies of Kansas and Indiana to engage in the production of oil in this state and paves the way to increase Kansas oil output. The decree permits the companies to become producers as well as refiners and distributors. Kansas has thirty-one refineries with a daily output of 75,575 bbl. of crude petroleum.

For eight years Standard Oil has been under the guardianship of the Kansas supreme court and was prohibited from producing any oil on its own account. It could buy crude only from the Prairie Oil

Turn the Surplus Into Big Gun Amunition

& Gas Co., which in turn could only produce and transport oil. It would do no refining and could sell oil only to the Indiana and Kansas Standard Oil companies.

Kansas has more than 6,000,000 bbl. of crude petroleum stored in tanks waiting for a pipe line or enough tank cars to haul this to a refinery. Some of this oil has been in storage since 1915, though the owners are willing and anxious to sell and would have sold months ago if they could have obtained transportation.

BACON IN ACTIVE SERVICE

Milwaukee, Wis., Nov. 9—Frank R. Bacon, president of Cutler-Hammer, who was commissioned a major in the Officers' Reserve recently, has left for active service and is now an officer of the Quartermaster's Corps at New Haven, Conn.

P.-A. EARNS \$12.78 A SHARE

New York, Nov. 9—The Pierce-Arrow Motor Car Co. earned \$12.78 a share in the nine months ending Sept. 30. For the quarter ending the same time, the company showed net operating profits of \$1,809,729. From this there was deducted interest of \$5,381 and plant and equipment depreciation of \$117,333, leaving a surplus of \$1,786,015. The surplus for the nine months' period was \$3,796,129.

These figures are after deduction of all taxes to which the company is now subjected, excepting Federal excess profits and normal income taxes.

TRUCKS TO RELIEVE TRAFFIC

Hartford, Conn., Nov. 9—The transportation committee of the state council of defense is to test a new plan of transportation to relieve congested freight conditions in Connecticut. The plan calls for trucks to carry loads on return trips on which the trucks ordinarily would return empty and also for a utilization of all motor trucks which are idle part of each day or week. The state has 11,500 motor trucks, and the co-operation of owners has been asked by the commissioner of motor vehicles.

INTERCITY POST PLAN DROPPED

Washington, Nov. 9—The proposed establishment of a motor truck parcel post service between Washington and Richmond, Va., has been abandoned. A survey of the roads between the cities showed them impracticable for heavy trucks, although they can be put in condition. Conditions have been investigated in Savannah, Ga., for a motor parcel post service between that city and Statesboro.

NEW ACCESSORY EXHIBITORS

New York, Nov. 9—Six new accessory exhibitors have added to the national shows. They are:

NEW YORK

Challoner Co., Oshkosh, Wis.
Guarantee Liquid Measure Co., Pittsburgh.
Kales Stamping Co., Detroit.
Otis Elevator Co., New York.

CHICAGO

Air Device Co., Chicago.
Challoner Co., Oshkosh, Wis.
Guarantee Liquid Measure Co., Pittsburgh.
Wire Wheel Corp. of America, Buffalo.

Horning Adds to Duties

To Represent Motor Car Industry in Purchases Made for U. S. and Allies

Is Also Chairman of Automotive Section of Council

WASHINGTON, D. C., Nov. 12—H. L. Horning, chairman of the Automotive Products Section of the War Industries Board, Council of National Defense, has assumed increased duties as the accredited representative of the War Industries Board on all matters pertaining to automotive manufacture and production. Mr. Horning will pass on all contracts of the United States and the allies and on the distribution of business, character of concerns and so forth and will aim to get the lowest and best possible prices for the Allied nations, and co-ordinate all the requirements of the United States under the automotive division. He will do no buying but will arrange for all purchases, the buying to be done by the usual purchasers for the United States Government and its allies.

125 SHOW ON COAST

Los Angeles, Cal., Nov. 12—Special telegram—The seventh show conducted by Los Angeles dealers opened here today with 257 motor vehicles on display and 125 exhibitors of passenger cars, trucks and accessories. The value of exhibit is estimated at \$1,000,000. Practically all passenger cars are special body jobs or departures from stock products in some

features. The association spent \$30,000 preparing for the show and depends upon sales of floor space and gate admissions to get this back. If the show proves a success it will indicate probable return to normal condition of industry in Southern California within a few months, but if cars do not sell it will be positive indication that harder times are ahead and a retrenchment policy will be adopted immediately. The show is being held in the Sunday tabernacle and three adjacent tents, providing floor space in excess of 106,000 sq. ft. Every foot is sold.

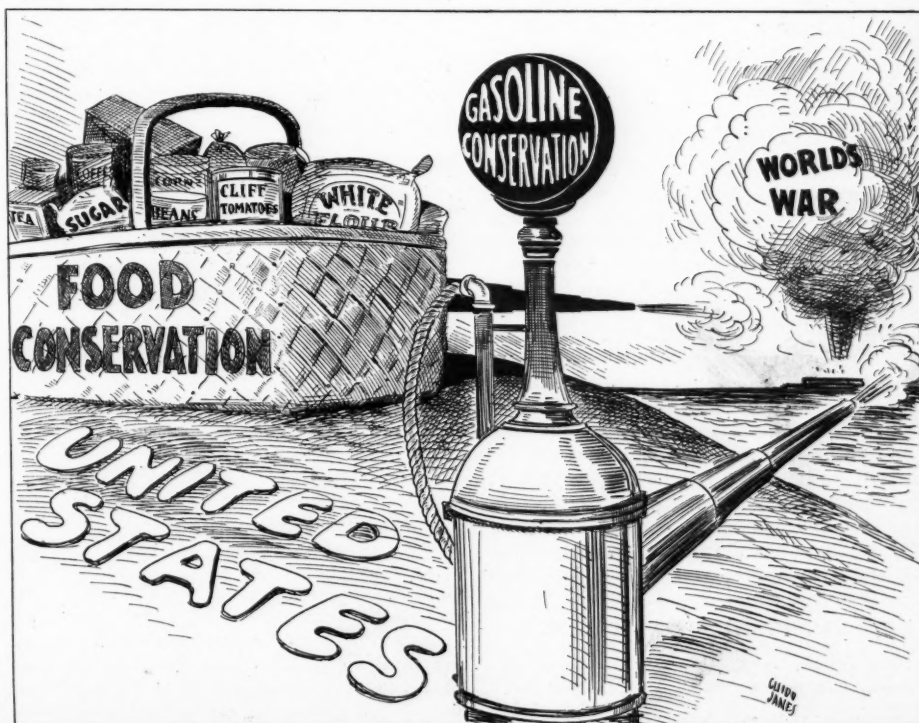
More than 300 posts in the tabernacle are transformed into imitation palm trees and give the effect of a palm grove. The military feature is provided by a replica war tank and real armored motor car and motorcycles. A war tax of 3 cents on admissions created a shortage of pennies and the show is meeting this with postage stamps as change.

SUN STOCKHOLDERS SUE

Chicago, Nov. 12—Further developments in the case of the Sun Motor Car Co. of Elkhart, Ind., which was placed in the hands of a receiver in September, were revealed Saturday, when sixty-one stockholders started a legal battle in the United States district court here in an effort to get back some \$110,000 invested in Sun stock.

The lengthy petition filed alleges that Andrews & Co., Chicago brokers, agreed to finance the Sun and was to take more than \$247,000 of the \$250,000 preferred, getting a like amount of common as bonus. It is further alleged that Andrews & Co. failed to turn over the cash in proper manner and as a result the whole financial mechanism,

Food and Gasoline!—Both Are Necessary to Win the World War



Show Your Patriotism—Help Save the Food

and the factory organization also, collapsed.

Andrews, when asked about the suit, state that they have offered to refund to their clients for the Sun stock by issuing them other stock whose value is unquestionable, that it was no fault of theirs that the plant was not a success, but was due to the inability of makers of motors for the car to deliver. That the brokers are the heaviest losers was presented in a statement by A. M. Andrews, manager of Andrews & Co., who says:

"Financial enemies of ours have been buying up the stock and are using it, I would say, to blackmail us. We lost more than half of all the money lost."

THOMAS TRUCK BANKRUPT

New York, Nov. 9—A lack of adequate working capital has forced the Thomas Auto Truck Co. into bankruptcy. The failure of this concern has carried with it the insolvency of the Consolidated Motor Corp., an associated concern. The latter concern occupied virtually the same offices as the Thomas company. The taking over by the receiver for the Thomas company of all assets belonging to this subsidiary brought it into bankruptcy. The liabilities of the Thomas company are stated to be about \$21,076, and its assets \$12,878. The liabilities of the Consolidated Motors Corp. are given as \$95,000.

KENT MEN CONVICTED

Trenton, N. J., Nov. 9—Frederick H. Clarke, president of the Kent Motors Corp., Henry F. Clarke, treasurer, F. J. Nagle and J. A. Simpson, stock salesmen for the concern, were today convicted of misusing the mails in connection with the affairs of the Kent company, capitalized at \$2,000,000. Prior to the finding of the indictments the corporation was forced into bankruptcy. In announcing its verdict the jury recommended that leniency be extended to H. F. Clarke, the treasurer, and J. A. Simpson.

FIRESTONE WINS POINT

Akron, Ohio, Nov. 10—The patent suit between Firestone and Goodyear took a new turn at Cincinnati this week, when the Federal court of appeals allowed a reopening of the case and sent it back for a rehearing in the Cleveland United States district court. The order is due to the discovery by Firestone of a Belgian tire-building machine, which it is claimed antedates the Goodyear-State. Goodyear claims its machine a pioneer invention, and it is alleged all other tire-building machines infringe it. Many companies which make machine-built tires are paying royalties, but Firestone is resisting in the patent suit. A year ago the Cleveland court sustained the Goodyear and the case was appealed.

HUDSON PRICES TO ADVANCE

New York, Nov. 9—The price of the Hudson car will advance Dec 1 from \$200 to \$300, according to the type of body.



Chapin Road Board Head Is Chairman of Newly Created Highways Transport Com- mittee of Council

WASHINGTON, Nov. 9—Roy D. Chapin, president of the Hudson Motor Car Co., has been appointed chairman of the newly created highways transport committee of the Council of National Defense. The purpose of the committee is to assist the railroads and other means of transportation in the movement of supplies during the war and to work with the highway authorities to maintain the public roads for such use. The other members of the committee are Logan W. Page, director of the Office of Public Roads; Henry G. Shirley, chief engineer of the Maryland road commission; and George H. Pride, president of the Heavy Haulage Co., New York.

This completes the list of transportation committees under the Council of National Defense and gives all forms of transportation proper representation in the Government war activities.

De Palma Sets New World Hour Record

NEW YORK, Nov. 10—De Palma, who has been trying for about a month to shatter the world's 6-hr. record in a Packard Twelve, made another attempt to-day at the Sheepshead Bay speedway. He was again unsuccessful in the 6-hr. attempt but established a new hour record of 109 miles.

The best previous distance ever made within the hour was a fraction over 107 miles, the achievement of Jean Chassagne in a Sunbeam car at the Brooklands track, England, in 1910. Chassagne's racing machine, however, was driven by an engine of 600 cu. in. piston displacement—twice that

of the twelve-cylinder aviation Packard engine.

De Palma's trial was observed by officials of the American Automobile Association, and will go into the archives as an official record.

De Palma's best lap was at the rate of nearly 115 m.p.h. But for a tire change his time would have been around 114 m.p.h. This is the second record de Palma has broken in the last ten days. Last week in the same car he established a new mark for 10 miles, which he covered in 5 min. 17.4 sec., or at the rate of 113.7 m.p.h.

During to-day's trials de Palma actually traveled 265 ft. more to the 2-mile lap, thus bringing his average for the hour up to 112.4 miles.

WAR DINNERS PLANNED

New York, Nov. 9—A comprehensive program for the winter meeting of the Society of Automotive Engineers has been announced by the meetings committee. The program will center around two important S. A. E. days, one during the New York show week, the other during Chicago show week. Thursday, Jan. 10, will be S. A. E. day at the New York show. Friday, Feb. 1, will be S. A. E. day at the Chicago show.

The culminating event of these days will be a war dinner. That at New York has been designated as the Automotive dinner and will be held at Hotel Biltmore, Thursday evening, Jan. 10. Accommodation for 1000 has been provided. Price per plate is \$5. The Chicago war dinner promises to be perhaps the greatest dinner ever held by the society. It will be a \$3 dinner and will come at the close of a day given over entirely to a professional session on farm tractors. A comprehensive program has been under preparation for some weeks. The accommodation is for 1900 diners in one room, and the Mid-West Section, which has the dinner in charge, has some features under preparation which will make it the greatest war dinner held in America.

SPEEDWAY MANAGERS TO MEET

New York, Nov. 13—Special telegram—The contest board of the American Automobile Association has called a meeting of managers of speedways to be held at 501 Fifth avenue, New York, Saturday, Nov. 24, to select dates for the 1918 racing season and to make any changes in rules that war conditions warrant. With the Indianapolis and possibly Cincinnati speedways out of racing for the duration of the war the remaining speedways have some hard problems to solve.

DISCUSSES TRACTOR TESTS

Minneapolis, Minn., Nov. 9—The Minneapolis section of the Society of Automotive Engineers at its monthly meeting Nov. 7 in the Hotel Radisson approved tractor demonstrations for 1918. Nothing was included as to what kind of demonstrations there should be, but a committee was authorized to formulate plans suggesting

Turn the Surplus Into Big Gun Amunition

what sort of tests will be most useful to engineers.

Secretary H. C. Buffington and Stanley J. Miller of the Beltrair Tractor Co., St. Paul, favored field tests, as well as S. C. Pandolfo of the Pan Motor Co., St. Cloud, Minn. H. C. Bass of the Dunwoody Institute recommended the application of the former sealed bonnet, fuel and oil consumption and brake tests for the motor car to the tractor, with 100-mile runs across country under observation and a closing test of field work, with penalties for adjustments.

TRACTORS "SHOW" FARMERS

Toledo, Ohio, Nov. 9—Twelve tractors are being demonstrated at the county experimental farm near Strongville to show the farmers how they may increase their crops in spite of the labor shortage. The demonstration is being carried on by the county farm extension bureau with the co-operation of the state agricultural departments. Among the machines entered are: the Cleveland Creeper tractor, the International, Moline, Avery, Whitney, Huber, Case, Parrott, Beeman and Happy Farmer.

JORDAN SHIPMENTS GROW

Cleveland, Ohio, Nov. 9—Shipments made by Jordan for the week ending Nov. 3 were its largest. Twenty-three cars were shipped Friday. In the twenty-four day period ending Oct. 19 Jordan shipped cars valued at \$261,775 and showed a net profit for the month of a little better than 7 per cent. The shipments for October were twenty-seven per cent in excess of October a year ago.

CHICAGO DEALER CHANGES

Chicago, Nov. 10—Dealer representation in this territory has undergone several changes during the week. Louis Geyler, who has handled the Elgin in this territory for the last few months, is giving it up and is taking on the Dort. The factory sales offices of the Elgin will distribute that car in this territory for the present. The Dort agency was left open when Otto C. Owen, who has been selling the Dort and the Liberty, retired from the field. No information as to Liberty sales has been given out. The James Levy Co., handling the Chalmers, has acquired the local distribution of Buick, operating under the Chicago Buick branch. At the present time Levy operates in conjunction with other big dealers in the city.

G. W. Stratton has severed active connection as vice-president with the Harry Newman-Stratton Co., Chicago distributor for Maxwell, King, and HAL to devote his entire time to the G. W. Stratton Co., of which he is president, in the production of bodies for trucks, trailers and taxicabs. Increase of work of the latter concern, due in great measure to war orders for truck and trailer bodies, has made the change necessary. Harry Newman, president of the Harry Newman-Stratton Co., will continue the distribution of the lines mentioned as president and general manager.

Air Routes for U. S. A.

Four Transcontinental Airways Are Approved as Main Arteries of Navigation

Aero Club to Chart and Select Landing Places

NEW YORK, Nov. 12—Four transcontinental airways have been approved as the main arteries of air navigation in the United States, and the Aero Club of America has appointed a committee on landing places, of which Rear Admiral Robert E. Peary is chairman, to make all possible speed in charting the routes and selecting landing places. The proposed airways, as far as the itinerary has been outlined, are reproduced on these pages. They are to be called the Woodrow Wilson, the Wright Brothers, the Langley and the Chanute and Bell airways. The first is to be charted from New York to San Francisco and touch Cleveland, Toledo and Chicago.

The second would start from Washington and go through Virginia, North Carolina, Georgia, Alabama, Mississippi, Louisiana, Texas, where an airplane was used for the first time under conditions approximately warfare, New Mexico and Arizona to San Diego, Cal.

The Langley airway would run between Washington and Los Angeles. This route is the least definite. The Chanute and Bell would run from Boston to Seattle, touching Albany, Syracuse, Rochester, Buffalo, Erie, Detroit, Grand Rapids, Minneapolis, Bismarck, N. D., Great Falls, Mont., and other cities.

ASCOT RACE NOV. 29

Los Angeles, Cal., Nov. 9—The annual winter racing season for Southern California will be inaugurated on the Ascot

park speedway here Thanksgiving day. The program will include three events, a sweepstakes of 50 miles, a 20-mile handicap event and a 20-mile race for non-winners. A purse of \$5,000 payable in Liberty bonds will be offered. In addition Katherine Stinson will make exhibition airplane flights. Included among the drivers who have announced their intention of competing are Louis Chevrolet, Oldfield, Cooper, Hearne, Ruckstell, Milton, Patterson and Durant. This is the home of Dave Lewis, who campaigned the east this summer, so it is believed he also will appear in the Ascot races.

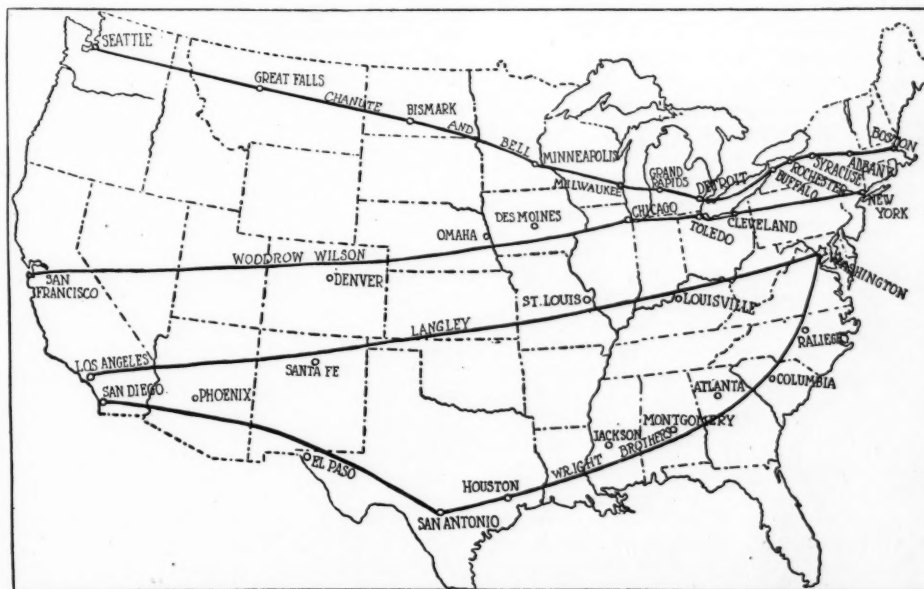
COFFIN HEADS AIRCRAFT BOARD

New York, Nov. 9—It is reported that Howard E. Coffin was appointed chairman of the Aircraft Production Board by the President Nov. 5. The board no longer is connected with the Council of National Defense but is an entirely separate organization. All the personnel, except one, has been named. Those on the board will include General George O. Squier and Admiral W. D. Taylor. The board will work in conjunction with the Signal Corps of the aviation section.

CONTRACTS FOR AIRPLANES

Chicago, Nov. 12—Airplane activities in the industry include the Buick contracts from the Aircraft Production Board for the manufacture of the 80-hp. LeRhône and the 110-hp. Gnome airplane engine. The Westinghouse Airbrake Co., Pittsburgh, Pa., also has received similar contracts. The General Vehicle Co., Long Island City, N. Y., has been given an order for 1000 Gnome engines for airplanes.

Harry Bill is to be factory manager of the airplane experimental station at Dayton, Ohio, of which Major J. G. Vincent is in charge. A factory 60 by 600 ft., two stories high, has been completed. Mr. Bill formerly was factory manager of the Chalmers company.



Four transcontinental airways to be charted by Aero Club of America. Rear Admiral Robert E. Peary heads a committee to select landing places



Even after the ride in which a soldier occupies the spare seat in the car, the recollection will linger with the one who has ridden with you

How the Motorist Can Help Using the Empty Car Seat

MANY motorists have discovered a very easy and very delightful method of doing their bits. In and about Fort Thomas, the recruiting camp on the palisades over the Ohio, car owners are making points of calling at the rookie camp for soldier guests.

What they are doing at Fort Thomas can be imitated in substantially every nook and corner of this whole country, for there are soldiers assembled for report, for guarding railways, factories, bridges, for this or that duty in, well, nearly every nook and corner of the lands. The story of the systematizing of aid for Sammie at Fort Thomas is of more than passing interest. The term aid, incidentally, is used advisedly, for despite Uncle Sam's care with the big national army, despite the infinity of organizations looking to soldiers' needs Sammie does need and along one especial line.

In Every Camp

Uncle Sam, in the matter of both volunteers and the selective draft is getting many, many men beneath the age of twenty-two. Better-to-do young men of those years have been largely in college, school or at their first jobs those years, have not had vacations alone to any extent, have seldom been away from home very long. Poorer young men, unable to continue so late in the schools, have worked those years, of course, but without, as yet, accumulating so much as allows of distant junkets. They come into the army and are suddenly transferred to some distant recruiting center, a post where inoculations are given and the "heel and toe" is taught. They feel, all of a sudden and with keenest pangs, the absence of loved ones, accustomed faces, accustomed things. Foolish? Perhaps, Jack Roosa, back at Nashville would have laughed to scorn anyone who would suggest that big, hearty Jack would grow homesick.

At the recruit camp things are very, very

PUT A SOLDIER IN THE SPARE SEAT

Editor's Note—The accompanying article tells what is being done at one camp. The same thing is going on at all the big camps where soldiers and sailors are gathered. When once the ice is broken, no one enjoys the motor trips with the boys so much as their hosts. The conservation of the unoccupied seat is the suggestion of the War Camp Community Recreation Fund, of which John N. Willys is national committee chairman.

Would not you enjoy having a soldier or sailor boy as a guest for your Sunday drive and perhaps your Sunday dinner?

Here is how!

Call up your local headquarters of the State Council of Defense or the Y. M. C. A., or the headquarters of the War Camp Recreation Committee, if there is one established in your town. Tell them that you want to take one, two or three sailors or soldiers out for a ride. They will arrange it.

If you can't spare the time or are too far from a camp—

"Three Dollars for Each Soldier" will cover the whole cost of one year of bringing the whole activities of the War Camp Recreation Committee into play.

MOTOR AGE will receive subscriptions for the War Camp Recreation Fund and will see that they are forwarded to the proper place. Address War Camp Recreation Department.

different. To begin with, you are no longer an individual, so to say, you are a numbered private. You, plus so many others like you, make up a squad, which has its own number. So many squads make a company, so many companies make a regiment. Everyone has duties which he is trying his level best to master, everyone is a bit weary and with nerves on edges, doing things he has not at all been used to and, in most cases, being on his feet longer than he has been before.

The first day or two the novelty of it all overcomes the other phases. The third day

the sense of beginning to get onto the ropes gives a superior thrill. But by the fourth day, when the vaccination is taking other things occur!

Jack Roosa comes to the cot in the long cantonment and sits down. His arm is smarting, and he knows that if he were home Charleen would bring the tin basin with warm water, and Mother would tempt his appetite with a pigeon from their own flock. Brother would be home from school soon and read aloud to him. He begins to wish he were there. He begins to think of home and Jack, the same Jack who ridiculed the idea of homesickness would give a year's pay then and there to be home. He wants consolation. The cot beyond has its sleeping tenant. The cot beyond this is empty. The man in the cot beyond that is not the sort who would seem to care.

Homesick

Jack steps outside. Tears dim his eyes and he doesn't want anyone to see them. He slinks to the woods sloping to the river, and there he pours out to himself the harrows of a lonely soul. And then, well, curious how in real life chance seems to direct the right hand to us at the proper moment! That certain good "Y" workers at Fort Thomas should have seen just such a case a thousand times, learned how to trace it up, how, finally, to cure never once enters Private Roosa's mind. All he knows is that, of a sudden the trees part and a man in the uniform of the "Y" is beside him with a cheery word.

Jack has never been away from kin so far before. Even on summer vacation they always have traveled together. The "Y" worker draws him out and finds he is the sort of chap who would enjoy a motoring junket, who likes the woods, the fields, the country. He gets his name and camp address. By and by, the soldier cheered, the "Y" man has him back at camp and leaves him.



A jolly truck crowd with the soldiers along. Sprucing up for the ride in the spare seat of a car, right

A day or two afterward a curious thing happens. Private Roosa receives notice to call at the Y. M. C. A. hut at convenience. Arrived there he is handed a little invitation. Some owner "is making so bold" as to invite him to motor with them this weekend. The soldiers are to do so much for them, they would be most happy to do what they could by tendering a vacant seat in the car to a soldier. Would he be at the post gate say at 9 and be prepared to stay until say 9 that evening, leave permitting? They would get him back on time. And would he kindly telephone his acceptance?

The "Y" worker behind the desk, who knows what these notes contain, steps up to Private Roosa and tells him to go on. This work is done by the official chaplain at Fort Thomas. He arranges with owners to take soldiers out on holidays and weekends.

The chaplain has arranged with the Y. M. C. A. men to get names and addresses of the men, to tabulate them as far as possible, according to soldier types. He also has arranged with the helpers of his own church for a systematic catalog of people who would take a soldier in for Sunday dinner or tea. From this he has enlarged to cataloging those who would take a soldier on this weekend junketing and had them designate briefly type of men wanted. A builder, for instance, would be assigned a man of more technical training; a business man, a soldier who was a clerk perhaps.

The carrying out of the program becomes simple, once the basic suggestion is taken. Where a post near your home town has a

Y. M. C. A., ask the workers there to keep their eyes out for men needing cheer and to list these. Where there is no such hut, the local commandant no doubt will supply you the same. Or soldiers may be taken at random. In every case the pleasure given, the appreciation shown the man who is going forth to risk even life for you cannot help but make a better soldier of him.

Armored Cars on Trip

DETROIT, Nov. 9—Three armored cars from the Ordnance Department of the United States Government passed through this city yesterday on a test trip from a far eastern point to a city in the Middle West. Two of these cars were of the light type, and the third was of the heavy car type. All were completely equipped as if for war service and were fully manned with a crew of three men—one driver, one machine gun operator and an extra man. A heavy commissary truck accompanies these three cars carrying the tents and supplies so that the troop is independent and is living under war conditions.

Two of the cars—the light type—are mounted on the standard King chassis. They are fitted with wire wheels and pneumatic tires, the tires on the rear being of the dual type. The heavy armored car is mounted on a White chassis and fitted with disk wheels and solid rubber tires. In spite of the fact that the former cars weigh about 7500 lb. each and the latter 8000 lb., not including the crew, a speed of 30 m.p.h. is not uncommon.

The armor on these cars is said to be sufficiently strong to resist machine gun

fire and covers the entire car with the exception of the wheels. The radiator is provided with a hinged door, and even the lamps are enclosed in steel boxes provided with a hinged protection. A swinging turret is mounted in the center of the car and with the exception of small slits for the driver and the machine gun operator, all openings are completely covered. The crew wear football helmets to prevent them from injury in case of accident or when being thrown to the side of the car when passing over a bump.

OKLAHOMA "OVER THE TOP"

Oklahoma City, Okla., Nov. 9—Oklahoma City has gone over the top first, and to a dealer here is largely due the credit. When Dick Carhart, president of Carhart Motor Co., Willys-Overland dealer, was in Toledo in conference with John N. Willys, the latter, who is head of the War Camp Recreation Fund campaign, asked Mr. Carhart to raise \$10,000 in Oklahoma City. The campaign was to begin Nov. 4. Mr. Carhart returned to Oklahoma City, and lined up a committee of three, of which he was a member, and raised \$8,000 five days before the campaign was to start over the country.

130-MILE TEST ECONOMY

Atlanta, Ga., Nov. 12—Complete data on the recent motor truck test run between Fort McPherson and Fort Oglethorpe show that the transportation of eighteen soldiers and their equipment was at a saving of \$2.89 a man and at least 3 hr. in time, as compared to special railway train service. The distance was about 130 miles.



Armored cars at Detroit, left to right, White supply truck, White armored car and two King armored cars



Before breakfast activities at Norristown, where our boys are training to handle ambulances. Note the filter bag where water is purified and the tiny shelter tents which are all the boys have with them on their trips

Training Ambulance Corps

Allentown, Pa., Scene of Activities

THE largest concentration of United States ambulance units ever held by an American army is now undergoing a period of intensified training at Allentown, Pa. It is a brand new organization known as the United States Army Ambulance Corps. This organization has absorbed all of the Red Cross ambulance units which no longer exist as such. Its work is the rescue of wounded troops in the zone of fire in the frontline trenches and in the hazardous No-man's Land between the lines of our boys and those of the enemy. Ambulance work behind the frontline trenches and farther inland will be handled by other medical organizations of the army.

Equipment Entirely Motorized

The vehicular equipment of the new organization is entirely motorized, the ambulances of which are exclusively Fords with the new standard type of United States army body which is superior to any types heretofore used abroad on the same type of chassis.

The camp was established at the fair grounds at Allentown, Pa., early in June. Since that time 5000 men have been undergoing a period of intensified training. At the time this article is written there are about 4000 men at the encampment, the other 1000 having completed their course of instruction and been transported "Somewhere," generally understood to be France.

All of these units, which comprise sections from all over the country, have been taken over bodily by the Government and are now under its sole control. The ambulances which were presented to various of these units by philanthropic organizations of one kind or another or by popular subscriptions have been shipped to Allentown but have not been taken over by the Government because of its determination to employ nothing but the Ford chassis with its new standard type of body for ambulance work. The other ambulances, which are mounted on $\frac{3}{4}$ -ton White chassis, Smith Form-A-Trucks, made from converted Fords and the like, if taken over at all,

Note—This is the first of a series of three articles on training camps where our boys are learning warfare.—Editor.

will not be used by the units to whom they were presented but will be employed farther behind the lines.

There is a great spirit of earnestness and democracy among these men. They give one the impression of having the sole idea of welding themselves into a highly efficient organization. The fact that a man is wealthy in his own name or the son of a rich father gets him no special privileges at Allentown. Here you may find a man worth a million or thereabouts acting in the capacity of a mess orderly serving food to an officer worth a thousand dollars, more or less. Due to the average high intelligence of the men there are very few infractions of the military rules but a rich man must take his medicine along with the

poor one in the punishment for military disobedience.

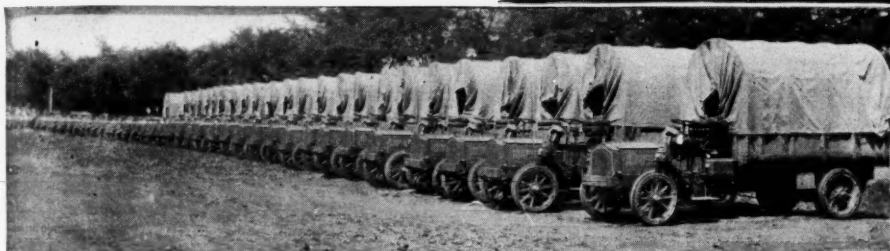
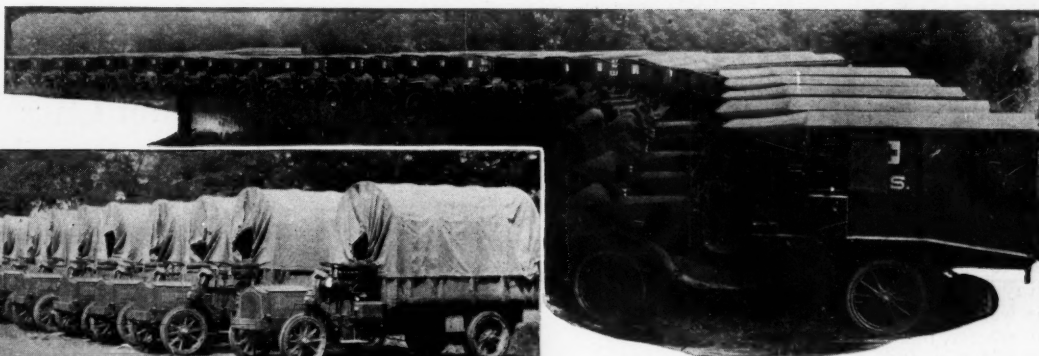
Two illuminating examples which give concrete proof of the highly efficient manner in which the camp is run may be had from the manner in which the Fords shipped knocked-down are assembled and in the manner in which the mess hall is run. A recent shipment of twenty Fords which came knocked-down in wooden crates, each holding two complete vehicles, was unpacked, assembled and equipped in 8 hr., from 7 p. m. to 4 a. m., with an intermission of 1 hr. for the midnight supper. These vehicles had to be assembled and their bodies applied in order that they might be shipped with a quota of ambulance units to leave the camp the following day. Due to the absence of any permanent illuminating system in the paddock inside of the track where the Fords had to be assembled, all of the work was done

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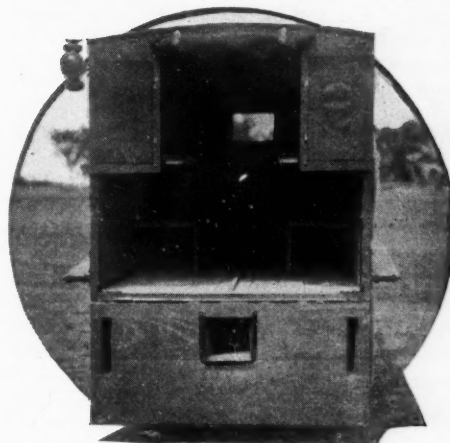


This is the mess hall at Allentown, Pa., where our boys satisfy the inner man

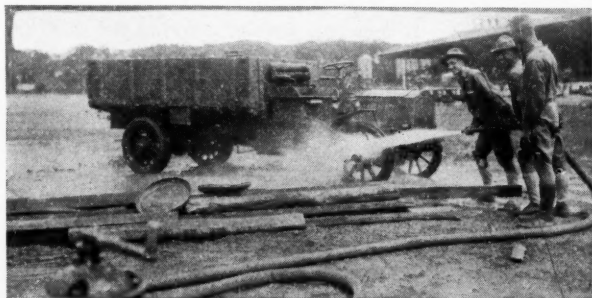
Right—Cranking up for a test run of the ambulance equipment at Allentown



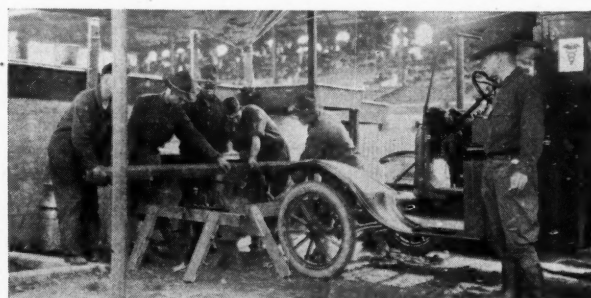
Seventy Packard 1 1/2-ton trucks, some with bodies and others awaiting the fitting of the regular army-type bodies. Two of these trucks are furnished with each ambulance section and their duties are general



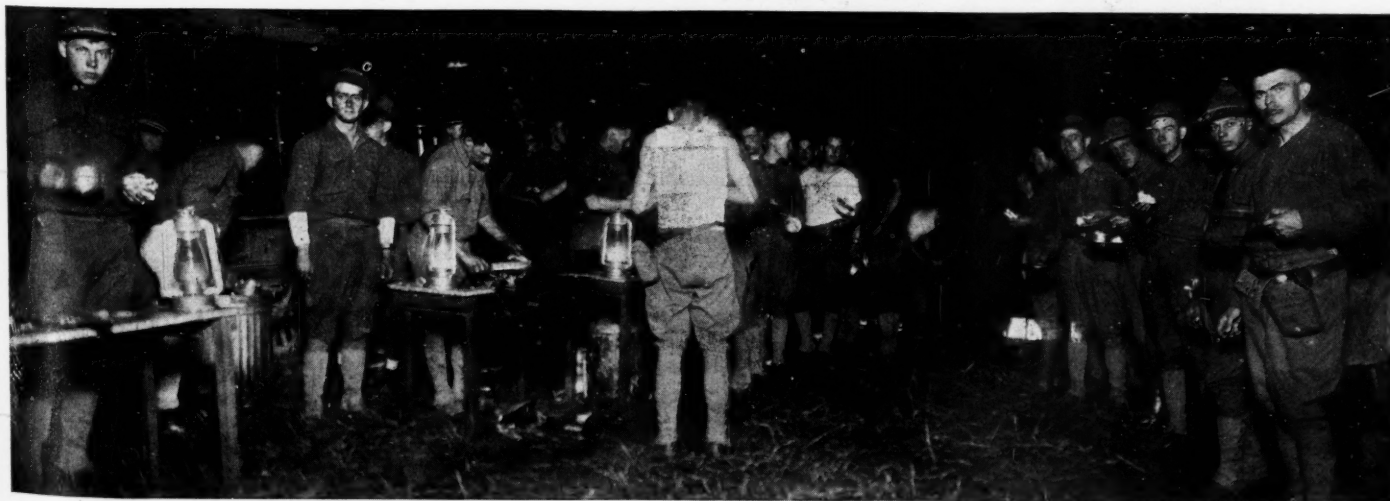
Left—A Packard 1 1/2 ton hauling a trailmobile kitchen which furnishes food to the boys at Allentown. Right—Rear view of the Standard Ford ambulance body showing the pockets in the lower half of the rear which swings down out of the way for loading. Two stretchers are carried on the bottom and a third in the center above the others



How the ambulance corps men at Allentown wash their trucks each day



Allentown ambulance section repair men overhauling an engine in the field shop



Getting a hand-out in the wee' sma' hours, after the men arrived at Norristown. This is to last them until breakfast time

Winter Versus Fuel Economy

How Effect of Cold Weather on Cars Can Be Averted and Gasoline Saved

In Two Parts—Part I

By B. M. Ikert

Motor Age Editorial Staff

COLD weather is the greatest foe we have to combat in our efforts to conserve the supply of gasoline. We have no way of telling exactly how much gasoline is wasted in coaxing balky engines to run in winter, but it is probably enough to supply the wants of our army trucks for a long time. The greatest waste comes in where a car is housed in an unheated garage and the owner has made no provisions for easy starting. The engine of such a car is cold and stiff in the morning and the suction of the pistons is not great enough to lift the heavy particles of fuel to the combustion chambers. Even if it does get there it is so hard to vaporize that the spark has no effect on it, other than to burn it sluggishly. The excess gasoline drawn into the top of the engine runs back down the manifold walls into the carbureter, overflows in the mixing chamber and then drips hopelessly to the floor to be lost forever without having done an ounce of useful work.

Starting Bugbear

Hard starting has always been the bugbear of winter driving for some owners and probably accounts for many of the cars that are laid up during the cold season. On the other hand there are those who have broken down Boreas' frigid attacks by fitting priming devices, hot air stoves, etc., anything, in fact, to get the same efficiency from the vaporization system in winter as in summer. It is a grave mistake to let the starting motor turn the engine over 2 or 3 min. at a stretch in a vain attempt to make the engine fire. Better would it be to spend 5 or 10 min. in getting the engine ready before the starting motor is revolved at all. Not only does needless use of the starting motor waste gasoline, but the battery suffers as well and may in time become totally exhausted, owing to its increased duties in winter.

There are still being operated cars that have a long intake manifold with the carbureter hung away down near the crankcase. Such engines are always hard to start in winter. Modern tendency is to hang the carbureter as high as possible so the gas may have a direct passage into the cylinders, thus minimizing the danger of condensation in the intake manifold and subsequent loading of the engine. Modern carbureter installations are so arranged that usually the engine can be started by normal use of the starting motor, provided the air supply to the carbureter is temporarily cut off by the choker. It is on the older types where difficulty is experienced. But even here things can be helped considerably. In the first place the owner can heat the manifold by building a sheet

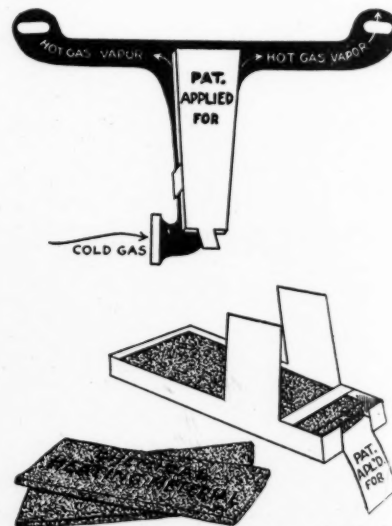
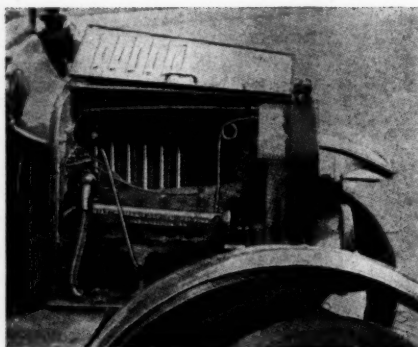
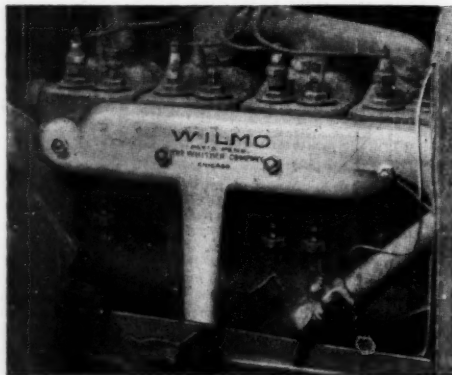
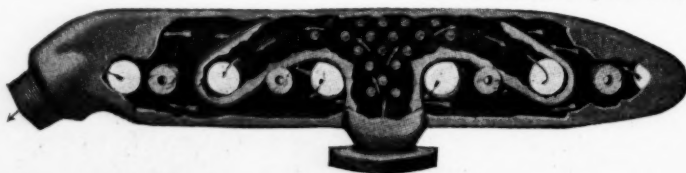
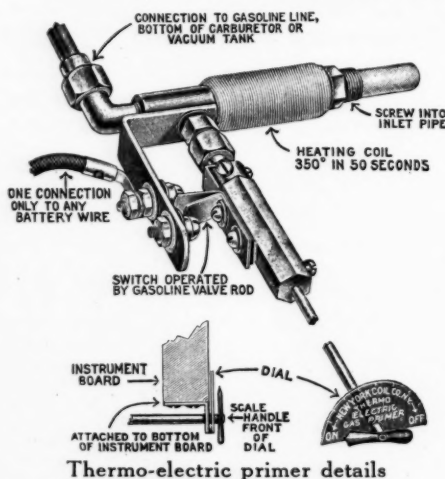
metal stove around it and taking heat from the exhaust manifold by a flexible tube, or running a pipe tapped to the exhaust close to the manifold and wrapping the whole with asbestos, as shown in the illustration. A ½-in. pipe is sufficient for this and the end can be led down through the sod pan. The noise from it is slight and one of its salient features is that the heat comes as soon as the engine starts, whereas with a hot-water system of heating it does not come until the engine has been run for a considerable period.

Provide plenty of heat to the incoming air on the carbureter. It is an absolute necessity in these days of low-grade fuel to assist vaporization by means of heated air. A hot-air stove can be made out of sheet metal and clamped on the exhaust pipe close to the engine, suitable connection from it to the carbureter air intake being made by flexible metallic tubing.

What Priming Does

With a majority of engines priming is a necessity in winter, to insure quick starting. By priming the cylinders gasoline is brought right on top of the pistons close to the plugs where it gets the best chance to ignite. It does not have to be sucked through the manifold, where it might be condensed long before it ever gets to the top. One of the illustrations shows a home-made priming device which makes priming possible without leaving the seat. If there is no priming device on the engine or choker on the carbureter, a rag soaked in gasoline and stuffed in the air intake of the carbureter will often help in getting the engine to explode. Also the plugs can be taken out and fuel injected directly into the cylinders. Hot water poured over the intake manifold and carbureter helps.

It is bad policy to start out with the engine still quite cold, for a richer mixture will have to be fed to keep it going and this procedure is anything but conducive to fuel economy. Make it a point not to leave



Various manifolds designed for better starting. At top, the Hot-Pin, showing passage of gases; left, the Wilmo, combining intake and exhaust; center, installation of Hiatt manifold; Davenport manifold heater at the right, used only for starting

the garage until the engine explodes regularly on all cylinders, but do not race it unnecessarily to accomplish this. Give the oil a chance to thin out by letting the engine tick over slowly. Also keep the engine compartment as warm as possible when stopping for any length by covering the hood and radiator with a robe or hood cover made for the purpose.

May Be Frost

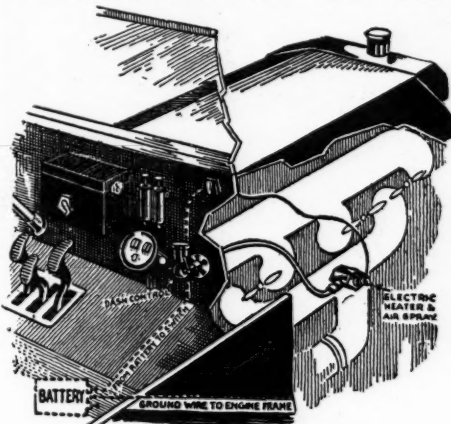
If in cold weather the engine runs regularly for a short while and then stops gradually without any apparent cause, there may be hoar frost around the throttle, choking the small passage through which the gas must pass when the engine idles. The remedy is to open the throttle a little more and the frost will be thawed out subsequently by the warm air coming through the carbureter.

Some of the later model cars are fitted with various forms of priming devices, intended to make starting easier in winter, while others have electrically-heated devices on the carbureter or manifold. For instance the Paige company has fitted an electric heating coil in the bowl of the carbureter to give initial warmth to the gas line.

Among the car fitments designed to make starting easier and less wasteful of fuel is the Imperial primer made by the Imperial Brass Works, Chicago. This is a simple plunger pump outfit that throws a rich spray of vaporized gasoline into the manifold near the entrance to the cylinders. The complete outfit consists of the

pump, auxiliary tank for high-test gasoline, bolts, connections and tubing for installation in any car. All connections are made with compression couplings, requiring no soldering, flaring of ends, etc. No holes need be drilled with the exception of drilling and tapping the manifold for $\frac{1}{8}$ -in. pipe thread. In operation one upstroke of the pump draws in a charge from the auxiliary tank and the next downstroke forces the charge, vaporized, into the manifold. It is said that the tank need be filled but two or three times during the winter, with ordinary use. The company advises high-test gasoline which can be bought at a drug store for the primer.

Another solution to cold weather start-



lecco manifold plug, which also primes the engine

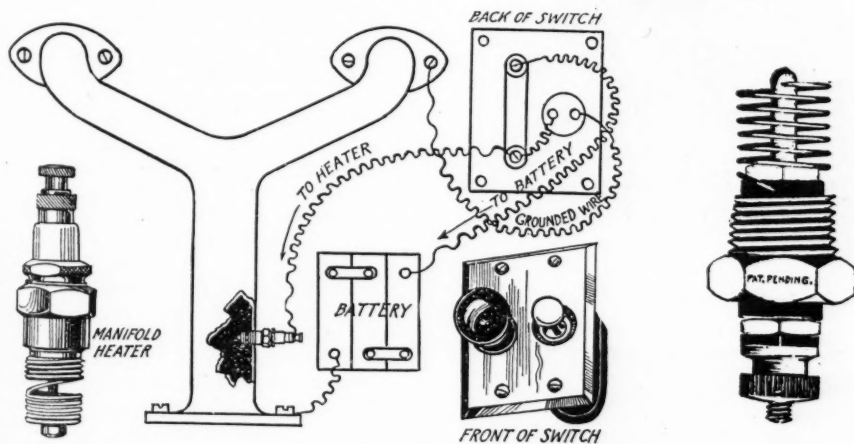
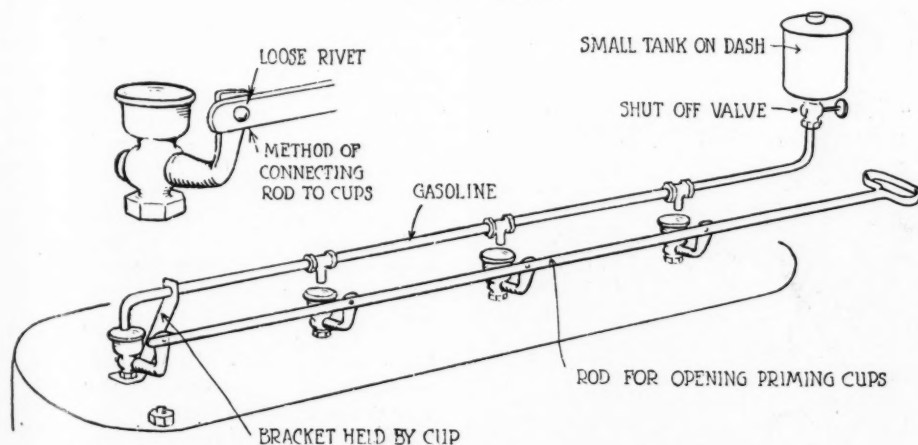
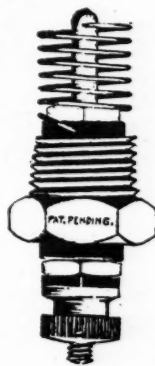


Diagram showing installation of Lepper electric manifold heater. At right, the Electro Gas vaporizer



Home-made device for priming cylinders from seat, left. By pulling or pushing the rod, the cups are opened and the cylinders primed by turning on the fuel. Imperial primer, right; M and R, connections; P, tank; O, outlet; K, dash pump; L and N, connections

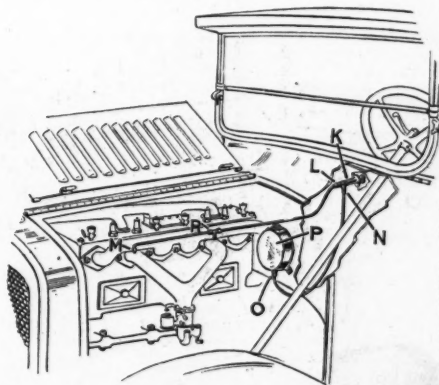
ing is offered in the way of a thermoelectric primer by the New York Coil Co., New York. This outfit is screwed into the inlet pipe and operated by a small lever on the instrument board. Connection is made to the main gasoline line or bottom of vacuum tank and an electrical connection is also made to the nearest battery wire. A turn of the lever operates the switch, which is left in this position for about 50 sec. Then current from the battery heats the coil which in turn causes a chamber to become heated. A further turn of the lever opens a needle valve and when the starter pedal is depressed gasoline is sucked into the heated chamber. All necessary piping and electric connections are supplied and the outfit is adaptable to any car. The only labor in installing is tapping a $\frac{1}{4}$ -in. hole in the manifold.

For Better Carburetion

Some concerns supply manifolds and heating devices for them, all intended for the prime purpose of getting better carburetion and facilitating starting. The K. B. C., which is a Chicago concern, makes the Hot-Pin manifold for Ford cars, which consists of a single manifold replacing the present intake and exhaust manifolds. The device is so arranged that the exhaust header completely incloses the intake manifold, the prime purpose being for the exhaust gases to heat the pin chamber on all sides. It is claimed that the incoming charge is broken up by exposure to the hot pins as the gas must wend its way between them before reaching the cylinders.

The Hiatt Manifold, made by the Hiatt Manifold Co., Indianapolis, Ind., consists of a manifold to take the place of the regular exhaust manifold on Ford cars, differing from the latter in that it has a pipe on the inside of the body. This pipe takes through it air from the outside, which combines with a water vapor coming from the radiator through a small copper pipe. This mixture is superheated, due to the exhaust gases passing around the internal pipe and upon collecting in the dome, the vapor-laden air becomes a gas which, when passed to the intake manifold and becoming mixed with the gas from the carbureter, is ready to ignite on the smallest spark, it is stated.

The Wilmo manifold combines the function of both the intake and exhaust manifolds. It is a one-piece casting with a thin dividing wall separating the intake from the exhaust gases. The heat from the latter brings the wall of the intake up to the



proper temperature, it is said, and fully vaporizes the gasoline before it enters the cylinders. It is made to fit Ford, Overland, Maxwell, Studebaker, Buick and Saxon cars and to install, an ordinary wrench only is needed. It is made by The Whittier Co., Chicago.

The Davenport Vulcanizer Mfg. Co., Davenport, Iowa, makes a manifold heater that is designed to be used when starting the engine only, after which it is detached. The heating material is a strip of chemically treated strawboard made to fit the holder and is ignited outside the hood with a match. The strawboard is converted presently into live charcoal and when the device is applied to the intake manifold the latter will be raised to the proper temperature for vaporization of the fuel, it is stated. There is no danger connected with its use. Extra heats can be supplied when desired.

The car owner is now able to buy heating plugs, which resemble to some extent ordinary spark plugs, and intended to be

screwed in the intake manifold to furnish a gasoline vapor independent of the carbureter. Some of them are made with priming attachments so that a richer mixture can be supplied for starting in cold weather. Most of the heating plugs are made with a heating coil, the resistance of which raises its temperature in a minute or so, to a point where the fuel in the immediate vicinity is converted into an explosive mixture. After the engine fires the switch closing the circuit of the plug

is thrown open. All of these systems operate on ordinary dry cells or storage battery. About all that needs to be done to get the manifold in shape for them is drilling and tapping it.

(Concluded next week)

New Use for Trees as Bodies for Trucks

IF you have ever read Victor Hugo's "The Laughing Man" you are thoroughly familiar with houses on wheels. But even the master romanticist, Hugo, has been excelled. Charles Kellogg, the California "Nature Man," who has an abhorrence of hotels and conventional life, has hewn out of a great redwood a body for his truck and also a home. At the request of Kellogg the Nash Motors Co. supplied him with a truck and the Goodrich Rubber Co. with the tires. Kellogg then had sawed a huge redwood, from which he gouged the center, leaving just the shell. To expedite his labor and also provide a symmetrical body Kellogg hit upon a plan of pounding his chisels and planes in the wood so that they rested firmly and then charged them with the truck, the solid tires catching the brunt of the blow. At length the top was finished, windows were cut, and here you have Charles Kellogg and his future home which will soon make their appearance in other sections of the country.

A Yacht That Sails Across the Continent

ROBERT E. MAGNER is a yachtsman on the Pacific Coast as a rule, and a former commodore of the Seattle Yacht Club, but the Pacific gets too lonesome for him sometimes. So he hit on a way to do some cross-country yachting and be a land yachtsman.

Touring by motor car seemed too much like hard work, especially for Mr. Magner's mother, who is seventy-six years old. Besides, there had to be a cruiser. Therefore, Mr. Magner built what he long had had in mind, an autocruiser. He got a Denby chassis equipped with electric starting and lighting and on this he built the autocruiser body. All the comforts of home are there. A tier of bunks across the front, directly back of the driver's seat, furnishes sleeping quarters. The bunks drop down when not in use and form one large, comfortable lounge. The driver's seat is wide enough for four to use at once.

Inside is a stove run by acetylene gas, gas light for interior illumination, cupboards for dishes, silverware and food, a sink with running water, a refrigerator with a capacity of 50 lb. of ice, a dresser large enough for wearing apparel for four, folding table and chairs and last, but not least, a folding bath tub.

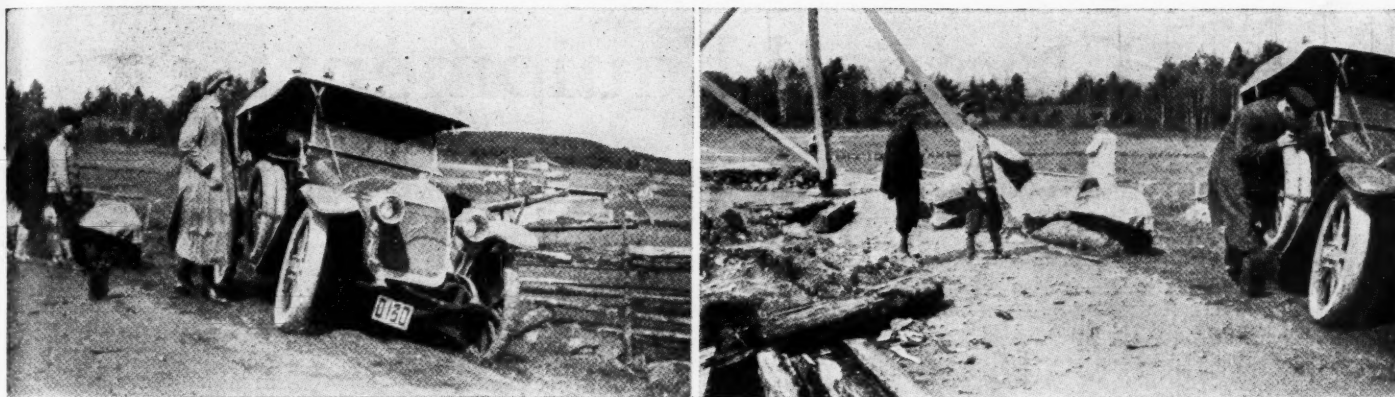
Below the body and above the frame are large storage tanks that hold 60 gal. of water, 40 gal. of gasoline and two Prest-O-Lite tanks of 100 cu. ft. capacity. With the gasoline in the main tank and the reservoir, the cruiser can cruise for 500 miles without filling. The body is light but strong. It can be completely inclosed by curtains.



Yachtsman's motor cruiser that travels by land instead of sea



The truck that has a body hewn out of a great redwood



Roads in Scandinavia are not the best. Europeans consider car service in Sweden the last word in tests

Where American Cars May Go After the War

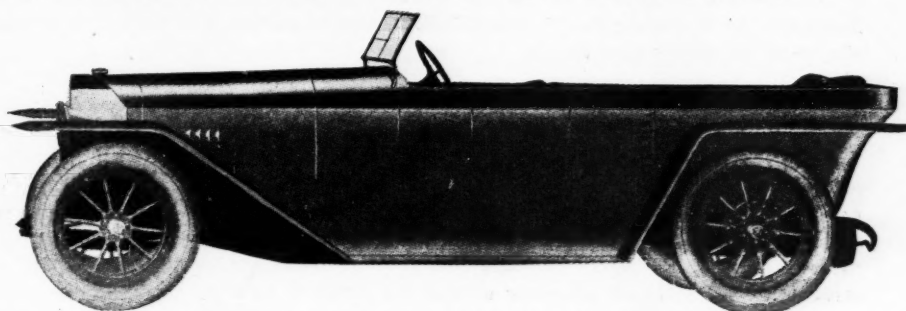
AFTER-THE-WAR Scandinavia offers a fertile field for American motor cars, trucks and tractors, according to Bigger Jacobsson, representative of the Scandinavian division of the J. B. Crockett Co., New York, who has made an extensive trip through that section. Motor vehicle use in that part of the world is at a standstill now. Difficulties in importing, shipping conditions, etc., have had this effect on Sweden, Denmark and Norway. Plenty of money, however, awaits the end of the war, when normal shipping conditions will prevail, and cars, trucks and tractors can be brought in.

The motor car is starting in Scandinavia where the United States began ten years ago. Public garages are being built; the farmer's hatred for the motor vehicle has disappeared; legal restrictions have been eliminated; plans for good roads are on the way; and, in fact, everything that opposed the progress of the motor vehicle five years ago has been eliminated by an insistent demand from people who have suddenly become rich from war business.

Abnormal Conditions

Conditions in the three countries are abnormal. The use of gasoline is practically prohibitive on account of the scarcity and the unusually high price, ranging from \$1 to \$3 a gallon. Its use has been regulated by all the countries. A royal decree has been issued in Sweden to conserve that country's supply of gasoline. Permission to buy gasoline must be secured from the industrial commission.

Before the royal decree Sweden had a fixed price for all gasoline held by the government. On the other hand, those who had large amounts of gasoline in store and who were not under a license sold this fuel above \$3 a gallon. Gasoline in Sweden always has been high. At the beginning of the war it sold at 45 cents a gallon. To conserve the supply before the recent royal decree, the Danish government made it a rule to take over 700 out of every 1000 gal. received by a dealer. Now supplies have become so scarce that hardly any one can buy. Even the royalty are using horses instead of cars. Only in long runs are cars being used, and even then much



American car fitted with the body which Scandinavia prefers

consideration is given in the use of the railway.

Sweden and Norway have very few tires, and though Denmark has a limited number of tires, only 50 per cent of them are being used because of the scarcity of gasoline. In many cases Swedish buyers are paying \$300 for one tire. The accompanying photograph gives a good illustration of what is considered a good tire in Sweden and Denmark. The Royal Automobile Club of Norway is licensing all buyers of tires and co-operating with Great Britain to see that none of these gets out of the country.

The scarcity of horses in Denmark has opened a big market for trucks and tractors. Denmark with a population of 3,000,000 is a big farming country and has big prospects for the sale of farm tractors. Sweden is mostly industrial and forms a good market for trucks. Norway, on the other hand, concentrates its business activities on fishing and shipping. This country with its huge tonnage, together with Sweden, after the war will handle a lot of transit goods to Russia and with its very good harbors transshipments will be made.

Each section of the world has its own styles of bodies, colors, etc., when it comes to the purchasing of cars. Dark and closely allied hues seem to be the predominating colors in Scandinavia. The accompanying illustration shows a prominent American car with a body conforming to Scandinavian body tastes. Disappearing tops and pointed radiators are the two big features of European body design, according to Mr. Jacobsson.

Sweden and Denmark are the only countries in Scandinavia building their own bodies, and it is said the demand for special bodies cannot be filled. According to Mr. Jacobsson's classification of the wants of three nations, Norwegian buyers want a powerful car, Swedish buyers a powerful car with a good body, and Danish



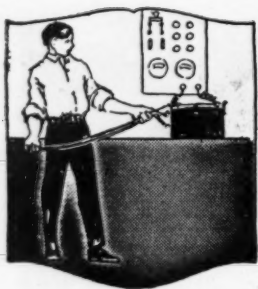
This costs \$150 in Sweden

buyers a small or medium-powered car, with a good body.

A little dissatisfaction has arisen in regard to tires. The American companies, it seems, have been sending tires over on their cars in the inch sizes. It is pointed out that millimeter-size tires are preferred. Another matter that should be straightened out is that in regard to straight-side tires. This type of tire has been shipped by the tire companies and has caused much trouble to the dealers, who have received their cars with side rims and have been forced to make their own rims.

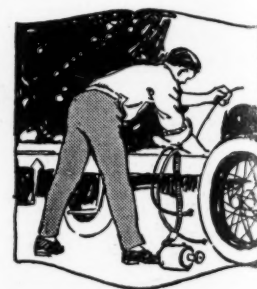
Poor Road Conditions

Before the war, and also during the first years of this war, the Russian car importers made it a habit of coming over to Sweden to ascertain how well the different cars would stand the roads. If a car got a reputation in Sweden, it was certain the Russian market also would be opened to it, as the roads in those countries are almost of the same type. As a result of poor road conditions, low-hung cars are not desired.



Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.



Editor's Note—Herewith is presented the sixty-ninth installment of a weekly series of articles begun in MOTOR AGE issue of June 29, 1916, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the U. P. C. Book Co., Inc., New York, in a size to fit the pocket conveniently.

The fundamentals of electrical circuits of the motor car were explained through their analogy to water systems, and the relations of current pressure and resistance were brought out. This was followed by an explanation of series and multiple circuits, how electricity is made to do work in lighting, starting, signalling, etc. Calculating the capacity of a battery for starting and lighting and the cost of charging storage batteries and determining the torque a starting motor must develop were explained. Action of primary batteries and dry cells was considered. A section was devoted to the makeup and action of lead and Edison storage batteries, and another to the care of lead batteries in service and the best methods of charging them. Magnets and electromagnetism then were considered, and the principles of generators and motors explained. A section on generator output was followed by one on the purpose and operation of the cutout. Electric motors and engine and motor connections then were considered. Ignition was taken up next.

Part LXIX—Ignition Systems and Spark Plugs

IF the vibrating coil timer and battery, with spark plugs, H1, H2, H3 and H4, and the high-tension magneto, with its spark plugs, M1, M2, M3 and M4, were combined on a single engine, the combination would be called a double system. A second double system could be formed by combining the low-tension magneto, non-vibrating coil, timer and plugs M1, M2, M3 and M4 with the vibrating coil timer and battery. Other combinations are used for combining the various single ignition systems into dual and double systems. The wiring diagram of a double system using a high-tension magneto in combination with a vibrating coil timer and battery is shown in Fig. 381.

Two-Spark Ignition

Two-spark ignition simply means that two sparks are provided for igniting the gas mixture in the cylinder at the same time, the object being to increase the power and speed. Magnetos used in providing two-spark ignition usually are provided with two separate distributors and in some cases with two windings served

by a common breaker. The wiring diagram on a Remy two-spark magneto is shown in Fig. 382.

Spark Plugs

The spark plug is one of the most important parts of the ignition systems, and no matter how carefully the remainder of the ignition system is constructed and installed the successful operation of the system is entirely dependent upon the spark plug. The spark plug is a very simple device which consists of two terminal electrodes carried in a suitable shell, which is screwed into an opening provided for it in the cylinder wall. A section of several typical spark plugs are shown in Fig. 383. The secondary, or high-tension, wire from the ignition device is connected to a terminal at the top of the plug, which usually forms the central electrode and extends down through the plug. This center member is insulated from the shell by a bushing of some form of insulating material. The electrode and bushings are fastened in a steel shell or body, which is provided with a threaded end at the bottom, by which it may be fastened into the wall of the combustion chamber. The insulating materials commonly used

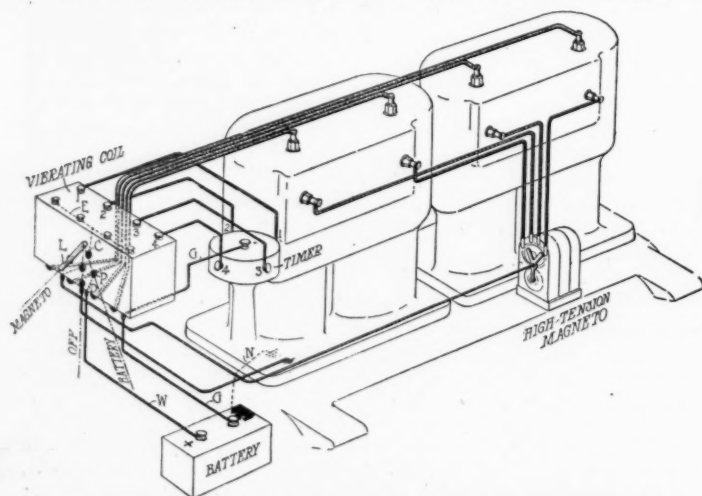


Fig. 381—Double ignition system using a high-tension magneto with a vibrating coil timer and battery

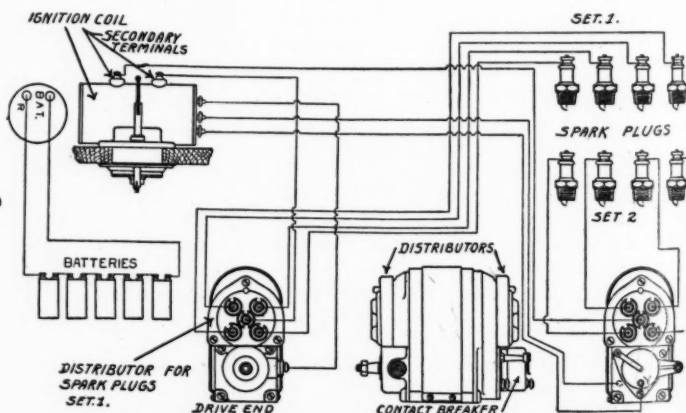


Fig. 382—Wiring diagram of Remy in which two sparks are provided for igniting the gas at the same time

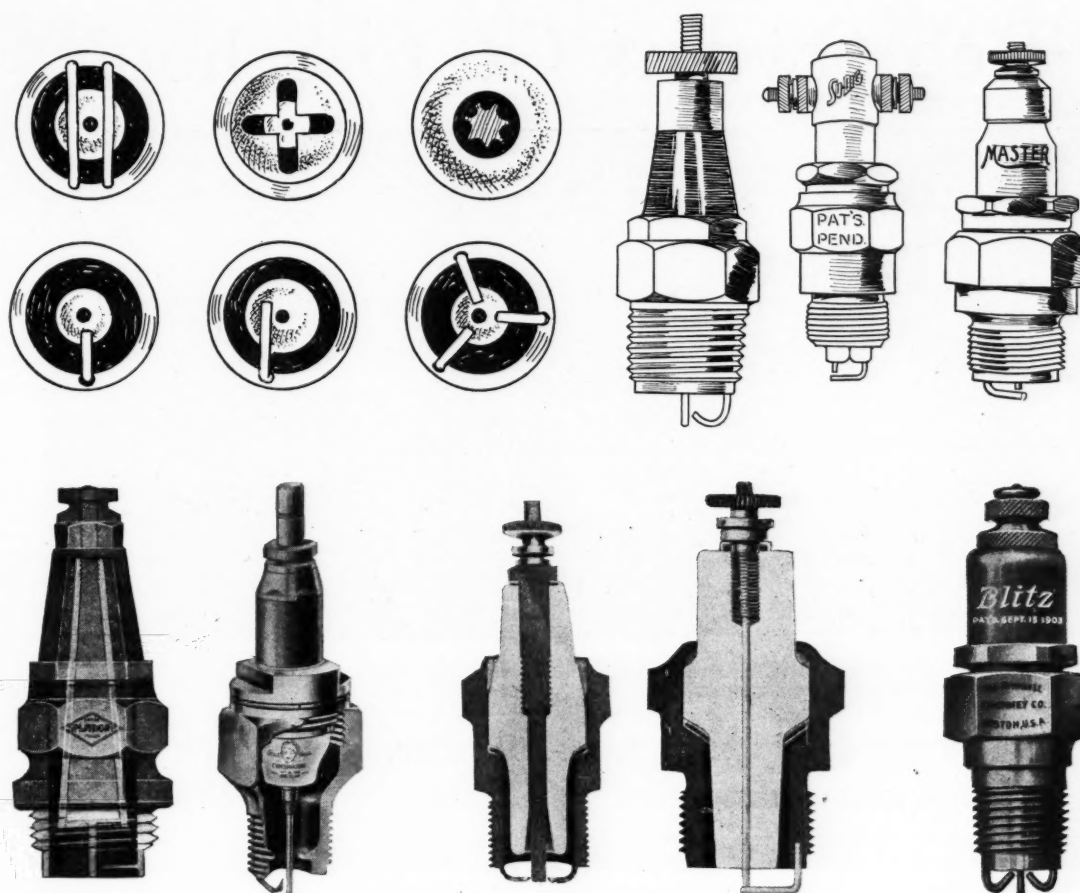


Fig. 383—A section of typical spark plugs, showing, upper left, typical ends; upper right, Kingston, Su-Dig and Master; lower row, left to right, Splitdorf, Red Head, Bosch, A. C. and Blitz



Figs. 384 and 385—Champion electrode of open points, left, and Center Fire bridge

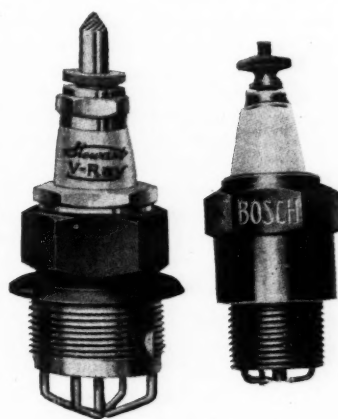


Fig. 386—Electrodes with several points on the Stewart V-Ray and Bosch

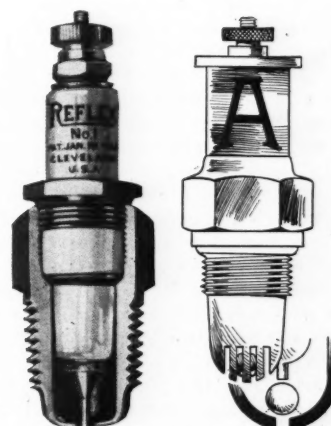


Fig. 387—Plugs with inclosed arrangement, the Reflex and D & D Fouless

are porcelain, mica, steatite and lava. Porcelain and mica are used more than any other insulations, because their mechanical and electrical characteristics make them better suited for this. When porcelain is used some form of insulating packing must be used to keep it from contact with the metal shell of the plug. This packing is required, because the porcelain and steel have different coefficients of expansion and it is absolutely imperative that some flexibility be provided at the joints to permit the two materials to expand differently when heated.

In the early forms of spark plugs the insulating material filled the shell at the lower, or sparking, end of the plug, which afforded a direct path for the current to travel over just as soon as this small surface was coated with carbon. It was nothing uncommon to have to clean this type of plug in less than 100 miles of running. This objectionable feature was greatly improved by allowing a space

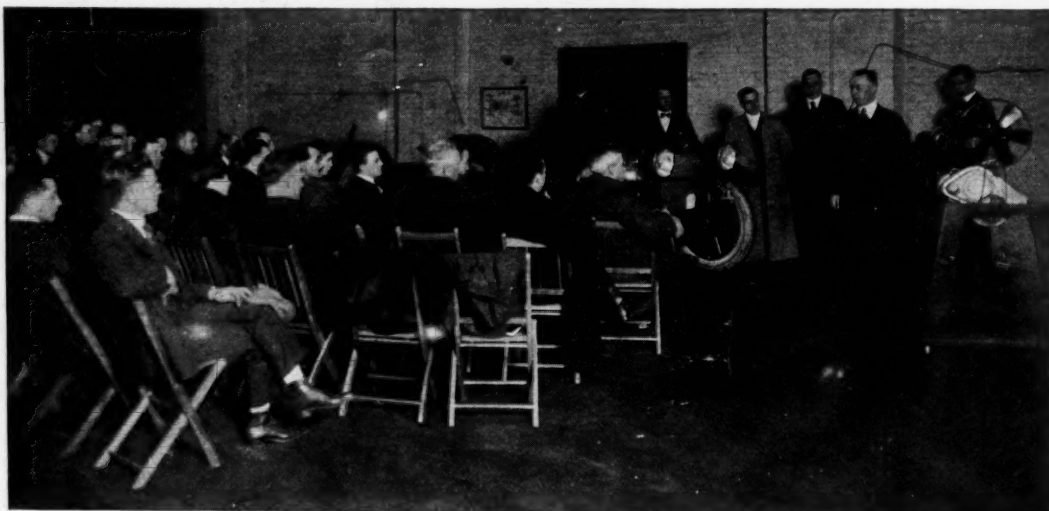
between the insulation surrounding the central electrode and the outer shell. This simple arrangement constitutes a basic parallel under which all spark plugs are manufactured.

Arrangements of Electrodes

The arrangement of the electrodes varies considerably and may take the form of open points as in Fig. 384, a bridge as in Fig. 385, several points as in Fig. 386, an inclosed arrangement as in Fig. 387, etc. Certain advantages are claimed for the plugs provided with more than one gap. This advantage, however, is more theoretical than practical, since the electrical current will bridge the gap offering the least resistance and should one of the gaps become shorted, by a particle of carbon, all of the gaps will be shorted.

Next Week—Series Spark Plugs

Reo Owners Go to School



The class of Reo owners at the service station learning how to care for their cars

Chicago Distributor Gives Instruction in Adjustment and Lubrication to Lighten Service Work

REO owners in Chicago want to become Real Educated Owners and the Reo Motor Car Co. of Chicago is giving them the chance they seek. Owners of Reo cars are going to school—not the three R's kind, but one of as much or more value to them if they drive than the readin'-ritin'-rithmetic kind. The school is a school of service, pointing the way for the owner to perform the minor work necessary in maintaining a car and thus relieving the Reo service station of much routine service at a time when men are needed for other more important duties. It was with the thought in mind of meeting the emergency of a possible labor shortage through the conscription act that the Reo conceived the idea of offering owners an opportunity of learning how to care for their cars more efficiently through classes in which each part of the car and its adjustment and lubrication is covered.

Early in October the plan was put into operation. So many owners favored the plan that it was found necessary to divide them into classes and notify them to come at regular intervals. Of the sixty odd invitations sent out for the first class, sixty odd responded. They came with all the propensities of the small boy for asking questions, some of which never had been presented to the men in charge before. Not only did the owners learn, but so did the instructors.

They came early and they stayed late. The class was supposed to last an hour and a half, but those that came at seven-thirty, and were well up front when the class opened at eight were there until 11 p. m. and were still asking questions. Two classes are given each week—one Tuesday evening and one Saturday afternoon. Not only are men in evidence, but women, too. Both a stripped chassis and an engine are used in the instruction. A

corner of the service station has been set aside for the classes and the class divided into two sections, one group surrounding the stripped chassis and one the engine. The engine is started, then put out of adjustment purposely and then readjusted so that each part functions properly. For example, the instructor, Walter Hoffman, makes a cylinder miss for one of a number of reasons, then proceeds to locate the cause and apply the remedy, those about him diagnosing the ailment first and then finding if they are right. It may be a plug is fouled, or a valve needs adjustment, or some other reason, but under Mr. Hoffman's instruction valve mechanism and other kindred mechanics become an open book to some owners who scarcely knew before that there are valves in an engine.

Instruction Is Thorough

Next comes the adjustment and oiling of various parts of the car. Owners are told how often to turn down grease cups, how much to turn them, where to apply oil with the oil can and how often, how to take up the back-lash in the differential gears, the care of universals, gearsets, clutches, in fact, the course of instruction is so very thorough that once a question is asked by any one in the class, that particular thing is so clearly explained that everyone understands.

The spirit of desire for greater knowledge of their mechanical plaything increases as the evening wears on and everyone seems to have some question that he or she wishes answered. The one asking the question benefits, but the benefit is many fold since all the others profit by being shown how a particular adjustment is made. Members of the class seem to have no desire to go home and it is almost necessary for the instructor to call a halt, in fact, it is necessary to get some of them

started homeward, even after 11 at night.

The Reo company believes it will save many hours for its service department if its owners can do the little odd jobs for themselves that almost invariably are brought into the shop and which require only a short time to execute. The service station manager told the writer of a case in point, where an owner went to considerable expense to bring a car to the service station for adjustment that, had he known what to look for, might have cost him nothing. This particular owner happened to be at Lake Delavan, Wis., when his Reo refused to start. He worked with it for some time and finally had it towed all the way into Chicago. Three minutes after the car came into the Reo service station the engine was running as nicely as ever. A battery terminal had sulphated. It only was necessary to loosen the connection, scrape the end of the terminal with a knife and also scrape the opening into which the terminal was inserted and replace. This may be an exaggerated example of car owner ignorance of minor difficulties, but everyone will admit that the average service station performs tasks fully as simple hundreds of times a year. These take the time of service men which could be used to better advantage. Knowledge of what to do and how to do it when some little difficulty is encountered not only saves the service station, but saves the owner's pocketbook as well, for service is not something you get for nothing, but rather something that is and must be paid for.

The idea of instructing car owners in work of this kind is attracting interest of dealers elsewhere. Already Reo has had inquiry from California and other states relative to how the plan works and these inquiries seem to be made with the thought of adopting such a plan which in time may become general in scope.

Women Who Make War Products

Italy's Airplanes and Cars Made with Feminine Aid

AS the war continues and the call for men becomes more and more insistent, women are having to take up a large share of labor hitherto considered purely masculine in requirements. Especially is this true in Europe, where the war has been taking its toll of labor and lives for three years now. The movement is not common to any one of the Allied countries, but less of the work Italian women are doing has been heard about than in England, France and, though to a lesser degree, America.

In North Italy women have taken their places by the sides of men in the great factories that supply the armies. Fiat has made extensive use of women as workers. First they were employed in the electrical department, where they were found particularly suited for the delicate tasks of making lighting dynamos and coils. Later they entered the machine shops. Now most of the radiators for the Fiat trucks and airplanes are made by women.

Many of the automatic tools in Italy's motor car factories are handled entirely by women, who wear a regulation suit of bloomers and blouse with close-fitting cap. Even in the iron foundry it has been found that many of the more delicate tasks connected with the making of molds are quite suitable for women and girls. The airplane departments are considered the other extreme in work. The work is light and clean, and the women greatly outnumber the men there.

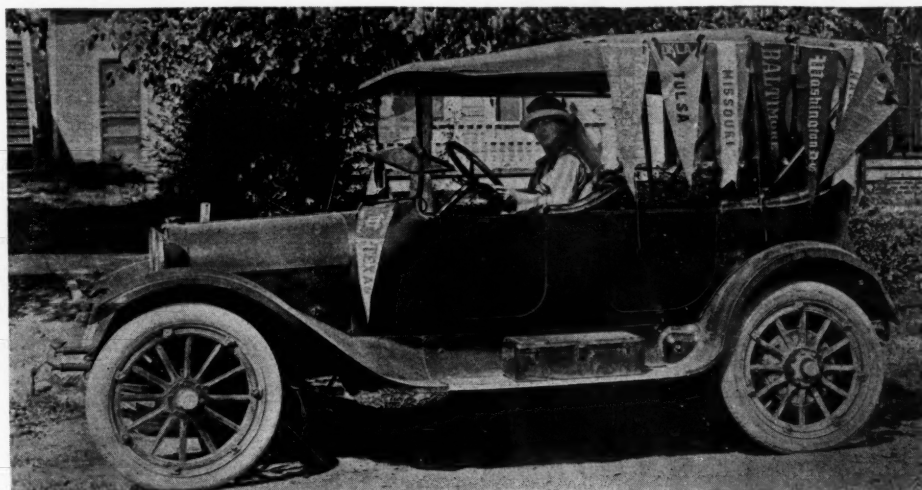
MAKES 7000-MILE TRIP

A tour covering eighteen states and 7000 miles long has been made by Miss Lucile Parks, a senior in the University of Texas. Miss Parks was accompanied by her mother, Mrs. J. L. Landrum of home economics division of the Texas State Department of Agriculture. Before starting the tour, Miss Parks took a practical course in motor car mechanics and served as her own mechanic throughout the trip.

Although the long tour which Miss Parks and her mother have just finished was full of pleasure from start to finish, it was not without its business features. One of its purposes was that Mrs. Landrum might visit the home economics departments of the different states. Miss Parks' special interests lay in visiting and investigating colleges and universities of the different towns and cities upon their route.

In their journey East, Miss Parks followed the southern route, traveling for the most part over well-marked roads. They came back over the northern route, passing through Pennsylvania, Ohio, Indiana, Illinois, thence southwest through Iowa, Nebraska, Kansas and Oklahoma.

Miss Parks has spent most of her life upon the Rio Grande border and is an expert shot with rifle and pistol. But she is



Miss Lucile Parks and the car she drove through eighteen states

a good mechanic also. Many times when their car became disabled at points remote from towns, Miss Parks with her kit of tools quickly made the adjustments or repairs necessary even if it was somewhat grimy and dirty work.

Making Cornbread Today?

ONE of Chicago's dealers has inaugurated something new under the sun, something that will help the Food Administration in more ways than one. This is a grocery department, at which the car owner can learn the nearest fair-priced store to his home. The project is based on the idea of giving real useful information. Every owner has a convenient shopping radius of from 10 to 20 miles, and this owner usually appreciates knowing where the cheaper groceries can be obtained.

But this is not all. Since MOTOR AGE last went to press more than one food economy has developed. First among these are the cornbread recipes, with which all the North seems to be experimenting just now. You know the South says the North never can make good cornbread of any kind. But if the North keeps up at the rate it is going that tune will have to sound somewhat different before very long. The main stimulant to this effort is, naturally, the wheatless Wednesday. Two Liberty bread recipes are available. One is the official recipe, as follows:

6 cups white flour
2 cups bran
2 cups cornmeal
2 tbsp. shortening
1 tbsp. salt
3 eggs
2 oz. yeast
Add milk or water to make stiff dough.
Let rise and bake.

Then there is the recipe by Mrs. Frank O. Lowden, wife of the governor of Illinois, which won a prize. It is:

$\frac{3}{4}$ cup molasses
1 tbsp. salt
1 qt. milk
1 qt. water
1 cake yeast
4 qt. rye flour
 $\frac{1}{2}$ qt. white flour

The following cornmeal recipes were prepared after practical demonstration by some Southern "mammies" under the direction of the Illinois State Council of Defense:

Corn Pone

1 cup cornmeal
 $\frac{1}{2}$ cup flour
2 tbsp. melted fat
 $\frac{3}{4}$ cup hot water
 $\frac{1}{2}$ cup sweet milk
3 tsp. baking powder
 $\frac{3}{4}$ tsp. salt

Mix cornmeal, flour and salt; add hot water and melted fat; then milk, and stir well. Scatter the baking powder over the top and beat in with a spoon. Form into two rolls with the hands, place in well buttered pan, and bake 20 min. in a hot oven.

Corn Bread

$1\frac{1}{2}$ cups cornmeal
 $\frac{1}{2}$ cup flour
1 egg
1 tsp. salt
2 tbsp. sugar
1 tsp. baking powder
1 tsp. soda
2 cups sour milk
2 tbsp. melted fat

Beat the egg; add cornmeal, flour, sugar and salt; then milk, and beat. Add baking powder and melted fat, pour into well buttered tin, and bake 20 min. in a hot oven.

Corn Griddle Cakes

$\frac{1}{2}$ cup flour
2 cups cornmeal
 $4\frac{1}{2}$ tsp. baking powder
 $1\frac{1}{2}$ tsp. salt
2 tbsp. sugar
 $1\frac{1}{2}$ cups boiling water
 $1\frac{1}{2}$ cups milk
1 egg
2 tbsp. melted fat

Add meal to boiling water and boil at least 5 min., stirring constantly. Turn into a bowl; add milk and flour sifted with dry ingredients. Add egg either beaten or unbeaten. Fry on a hot iron griddle slightly greased.

Corn Muffins

$1\frac{1}{2}$ cups cornmeal
 $\frac{1}{2}$ cup flour
3 tsp. baking powder
1 tsp. salt
2 tbsp. melted fat
2 tbsp. sugar
2 tbsp. hot water
 $\frac{1}{2}$ cup milk
1 egg

The Readers' Clearing House

A Plea for the Shopman

By One of Them

CALLED on a doctor friend recently. I had sold him a car. He greeted me and, supposing I had come to talk car, he launched into a complaint against a small bill which we had sent him for work done on his car. He had left the car with us to have a small defect remedied. The shop superintendent diagnosed the case and applied the remedy to the part he thought needed adjustment.

My doctor friend received the car, and his complaint was that it still had the same trouble, and then he said, "You sent me a bill for the job."

"Now, Doctor," I said, "Let's stick a pin there so we can find the place again. I've called on you for professional services. I have been troubled with an aggravating ailment for fifteen years. I want you to give me an examination and tell me what ails me and give me a remedy. Now, Doctor, I have had this trouble for fifteen years and I have consulted more than a dozen doctors—almost every one of them has located the cause of my trouble in different

parts of my body and has given me treatment. Every doctor has sent me his bill, and I have paid all of them, and my trouble is worse than it was fifteen years ago."

When a dozen doctors with trained minds and years of experience each diagnose my case entirely different and try to cure accordingly and fail, little wonder that the shopman should occasionally miss it in checking up a carburetor when the real trouble is a defective spark plug.

The doctor will charge us for treating our case whether we die or get well. Success or failure makes no difference. The shop can charge only \$1 an hour—must cure or his bill is protested.

The shopman is a human being. He is often rushed beyond the limit of patience. We do not give him time to take the "case under treatment." We need our cars every minute. We expect him to drop everything and fix our car at once.

Lubrication

Oil Leaks Into Clutch Case

Q.—My model 17 Chandler wastes cylinder oil, which seems to leak from the crankcase back into the clutch compartment and wash out through an opening in the bottom of this compartment.—Warren McClintock, Palo, Iowa.

This waste oil may come from either the transmission or engine. This model uses 600 W steam engine oil in the transmission and this becomes thin when warm, being easily mistaken for cylinder oil. If the oil level in the transmission is too high oil will leak through into the clutch housing. A loose rear engine main bearing or too high an oil level in the crankcase will cause oil to come into clutch compartment. If the clutch inspection plate is removed you can probably determine where the oil is coming from.

How Oil Indicator Works

Q.—I have seen some form of oil indicator consisting of a glass gage on the crankcase that had a rod with a small ball fastened to it on the inside of the glass. The position of the ball indicated the amount of oil in the sump. How does gage work—that is, is there a float of some kind in the crankcase?—Conrad Teeple, Denver, Col.

In Figs. 1 and 2 is an oil gage like the one you mention. Usually there is a cork float in the oil sump to which is attached a brass rod extending upward through a glass cylinder forming the gage. With this kind of a gage it is customary to fill the crankcase until the small ball on the rod, visible through the gage, is midway between top and bottom positions. On some of the gages the rod protrudes through the body of the gage at the top. This is done so that in case the float became stuck in the sides of the retainer it could be dislodged by a slight touch with the finger.

Engines

Has Annoying Knock

Q.—The engine in my 1915 Metz roadster has developed an annoying knock which is most apparent after the engine is hot. I think it is a piston slap, as the second and fourth pistons seem a trifle loose and have much more clearance than the other two. I have had all bearings taken up, installed new wristpins and patented rings, connecting rods lined up, etc. Compression is good on all cylinders and the performance of the car does not seem impaired. Would it be impracticable to replace the two with oversize pistons, or is it necessary that the whole block be reground?

2.—If I bought a new block could I use the

present pistons and rings and the same valves?
—J. M. Castleman, Los Angeles, Cal.

1.—If the cylinders are not worn out of round, it would be possible to install oversize pistons. Providing cylinders are too badly out of round, then purchase some standard size of oversize pistons from the manufacturer and have the cylinder block reground to fit the new pistons.

2.—It would be necessary to have new piston rings for a new cylinder block. The old valve and fittings, can, however, be used.

Engine Pounds on High Gear

Q.—I have a model A 15 Sphinx fitted with a Locomotive engine. There is a pounding in the engine which occurs only when running slowly on high or second. If the engine is given a little gas or speeded up it will run smoothly up

to about 15 or 18 m.p.h.; the pounding also occurs on hills when not going at a good speed and takes place with either retarded or advanced spark. The compression is fairly good in the front and back cylinders, but poor in the two middle ones. I have had the valves ground to a good fit and still the compression is poor in the two cylinders. There are no leaks around the plugs or head gasket. Under good conditions I can only get 35 or 40 m.p.h. out of it.

2.—Would there be any advantage in having slightly-worn pistons fitted with a Burd piston ring on top of each piston? If so, what size?

3.—There is considerable lost motion in the worm and gear in the steering gear. Is it possible to take up this wear and how is it accomplished?—J. Price, Portsmouth, Ohio.

1.—The pound in the engine may be due to one of several causes—loose support bolts; ignition timing too early at full retard, or possibly a loose crankshaft main bearing.

2.—In all probabilities a new ring in the upper ring slot will increase the compression to a certain extent. The size is $3\frac{3}{4}$ by $\frac{1}{8}$.

3.—If the slackness cannot be removed by taking up on the end play adjustment nut at the top of the steering gearcase it would be best to disassemble the gear and reverse the position of the worm on the shaft, cutting a new keyway. This will invariably remove any lost motion that may exist.

Engine Vibrates at 30 M.P.H.

Q.—My engine vibrates considerably at 30 m.p.h. and this sets up a vibration in hood, horn and instrument board, in fact, in everything that is not solid and rigid, making an annoying racket. Could this be overcome or mitigated in any way? Have put felts on floor boards to eliminate humming?—George A. Ormerod, Miami, Fla.

Vibration is one of the inherent characteristics of the four-cylinder engine. It is quite possible that the periodic vibration point of this engine comes at 30 m.p.h., hence it is more noticeable than at any other speed. There is no way of eliminating it. We would suggest that you make sure that engine support bolts are tight.

Fitting Connecting Rod Bearings

Q.—Give directions for proper procedure in fitting new connecting rod bearings in my 1917 Hupmobile, also in Hudson Super-Six.—L. M. Gilbert, Lewistown, Mont.

The installation of a new set of connecting rod bearings requires considerable skill on the part of the operator in order to secure a satisfactory job. The method of procedure for fitting and scraping bearings is practically the same for all types of con-

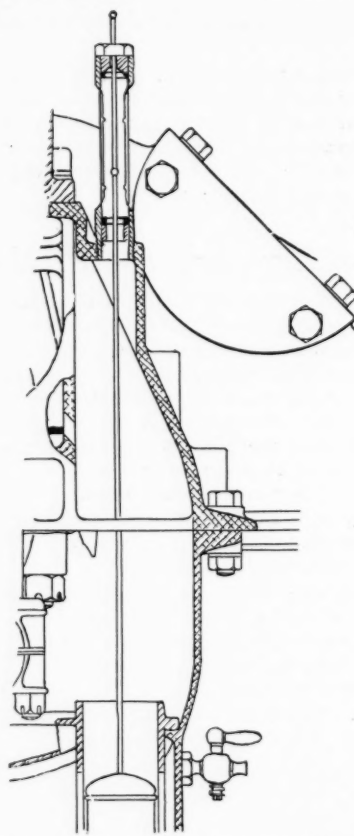


Fig. 1—Diagram of float-type oil gage

meeting rods. To proceed with this, install the bushings in the upper and lower half of the connecting rod and after they are in, coat the crankshaft with Prussian blue. Then attach the connecting rod to crankshaft just tight enough so that the rod can be rotated about it. After rotating rod about shaft, remove it and it will be noticed that the high spots of the bearings are coated with Prussian blue. With a bearing-scraping tool remove the high spots from bushings and repeat the process described above until a good surface is secured for the entire bearing. This is a tedious process and will require considerable time to fit the bearing properly. The side play of the connecting rod bushings between crankshaft fillets should not exceed .005 in. If it is found that the bearing is too tight upon drawing the connecting rod bolts up tight when it is attached to the crankshaft, it will then be necessary to place shims, which vary in thickness from .002 to .005 in., between the bearing cap and the connecting rod upper half in order to secure the proper adjustment. The same number and thickness of shims should be used on each side of the connecting rod.

Avoiding Sprung Crankshaft

Q.—My Buick D. 45 has been run 12,000 miles. It had only been run 500 miles when it developed the same knock described by C. N. Douglas in *MOTOR AGE* of Aug. 23. No one was able to locate it, but, acting on your advice to Mr. Douglass, I took out the shaft and found it sprung. Now, I want to know how to avoid springing the new shaft, as I don't want it to happen again.—Ralph Lee Wagner, Cimarron, Kan.

1.—If the main bearings are so fitted that the crankshaft seats perfectly in all bearings then the possibility of springing the shaft is least. Crankshafts of these cars have also been known to become sprung from faulty application of the brakes.

Carbon Remover in V-Engine

Q.—Is the use of a liquid carbon remover in a V-type engine satisfactory? The liquid will run to one side.

2.—What is the theory by which carbon is removed by introducing steam into the intake manifold?

3.—If steam is allowed to enter the intake manifold or mixture continuously, will this prevent the formation of carbon in the cylinders?—E. E. Pantzer, Sheboygan, Wis.

1.—Tests have shown that it is satisfactory.

2-3.—It could not be stated that steam is a carbon remover yet it is a good preventative. This is due to water breaking up into hydrogen and oxygen. If the oxygen present is in excess of that necessary for complete combustion then if combustion is practically complete, the possibility of free carbon being deposited in the cylinder is reduced to a minimum.

Carburetion

Why Front Cylinder Fouls

Iowa City, Iowa—Editor *MOTOR AGE*—From time to time I notice there are a great number of owners of Ford cars who are having spark plug trouble in the No. 1 cylinder. I find an ironclad supposition all over the country among owners and repairmen that this trouble is due to an oversupply of cylinder oil in the No. 1 cylinder, due to the design of the oiling system.

The real trouble is due to the shape and design of the intake manifold which is explained as follows: Due to the actions of

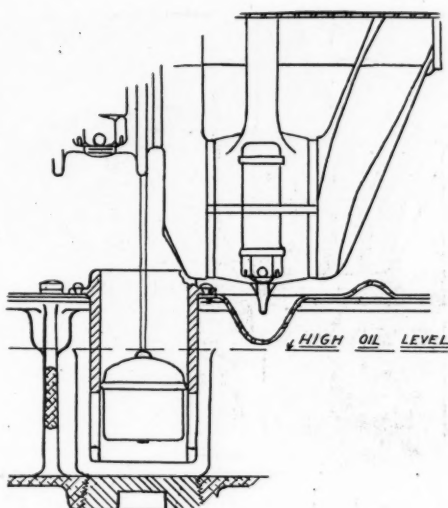


Fig. 2—Float of an oil indicator, showing location in sump

TO assist readers in obtaining as a unit all information contained in this department on a certain subject in which they may be most interested, such as ignition, carburetion, etc., *MOTOR AGE* has inaugurated the segregation of inquiries into classes of allied nature. Questions pertaining to cooling will be answered under that head and so on.

LUBRICATION

Warren McClintock.....Palo, Iowa
Conrad Teeple.....Denver, Col.

ENGINES

J. M. Castleman.....Los Angeles, Cal.
I. Price.....Portsmouth, Ohio
G. A. Ormerod.....Miami, Fla.
L. M. Gilbert.....Lewistown, Mont.
R. L. Wagner.....Cimarron, Kan.
E. E. Pantzer.....Sheboygan, Wis.

CARBURETION

Clayton Smith.....Iowa City, Iowa
W. Yantsch.....Dorchester, Wis.
J. B. Wells.....Salt Lake City, Utah
E. G. Goodnight.....Panama, Okla.
A. J. Downer.....Trenton, Ky.

THE ELECTRIC SYSTEM

W. A. Reul.....Wausaukee, Wis.
R. L. Wagner.....Cimarron, Kan.
N. E. Nelson.....Hartford, Wash.
J. Wilson.....Victoria, B. C.
J. B. Wells.....Salt Lake City, Utah
W. Yantsch.....Dorchester, Wis.
G. V. Slack.....Bloomington, Ill.

MISCELLANEOUS

J. F. Buck.....Morris, Ill.
R. L. Wagner.....Cimarron, Kan.
H. N. E.....Warren, Ind.
G. A. Ormerod.....Miami, Fla.
N. E. Nelson.....Hartford, Wash.
T. W. Holmes.....Chicago
A. H. Denton.....El Paso, Tex.
E. E. Pantzer.....Sheboygan, Wis.
W. L. Butler.....Bridgeport, Conn.
H. Lagasse.....Rice, Kan.
Oliver Sveir.....Minneapolis, Minn.

VALVES

Franklin LeCates.....Princess Ann, Md.
A. W. Hartford.....Chicago
C. H. Prior.....Pasadena, Cal.

REBUILDING

C. B. Atno.....Littlestown, Pa.
J. H. Kendall.....Chicago

No communication not signed by the writer's name and address will be answered in this department.

centrifugal force and gravitation the heavy grades of gas and some gasoline travel up the goose-neck on the side farthest away from the carburetor, straight up in upright pipe, and is pulled forward into the No. 1 cylinder causing an over-rich mixture which fouls the plug.

In my experimental work which I have been carrying on, I have determined beyond all doubt that gasoline trouble is the only trouble, and that the cylinder oil is no trouble at all. In fact, the No. 1 cylinder

is under-oiled because so much raw gasoline comes into this cylinder and goes down past the rings, thus cutting back the oil.

Under my observation which has extended over two years, I have not seen a Ford engine which gives trouble in the No. 1 cylinder which carried a Schebler-Ford equipment or a Rayfield-Ford equipment, or any other equipment that the carburetor had a top delivery to the manifold, or one with side delivery that carburetor sets at right angle to the engine. These carburetors cannot give trouble because they have eliminated the goose-neck which is parallel with the engine, or have top delivery, which is the real seat of the trouble.—Clayton Smith.

Misses and Smokes When Starting

Q.—Explain trouble with my Stromberg carburetor, model H. B. No. 2. When the car has been idle for several days, it feeds so heavily it misses and smokes and can barely be run. It usually clears after running from 3 to 5 miles, but it sometimes takes longer. Several times it cleared after running 10 min. After clearing it runs well for at least a day, and does not go bad while running. As sometimes it will be all right after standing three or four days and other times it will do the same when standing only over night, I cannot depend on it. I do not think the float valve is at fault, as the gasoline level in the float chamber always remains the same, about half full.—William Yantsch, Dorchester, Wis.

This trouble may be due to chokers not releasing properly thus giving a rich mixture which the engine cannot handle until it become thoroughly warm.

Installing Stewart Vacuum Tank

Q.—Describe how a Stewart vacuum system can be installed in a 1913 Cadillac?—Joseph B. Wells, Salt Lake City, Utah.

The vacuum tank can be mounted on the dashboard preferably about 6 in. above the carburetor gasoline connection. The mounting of the tank is simple and if you will refer to the Oct. 4th issue of *MOTOR AGE*, page 35, both the care and method of connecting are shown. The lead marked intake manifold goes to the main branch of the manifold where a hole is drilled for 1/8-in. pipe connection.

The two remaining connections consist of one from the lower part of vacuum tank to the carburetor and the other from the main gasoline supply connection to the gasoline tank.

Adjusting Stromberg Carburetor

Q.—Explain operation and adjustment of Stromberg carburetor used on 6-30 Chalmers.—E. G. Goodnight, Panama, Okla.

This carburetor is a plain tube type, having the air passages fixed in size, while the gasoline is automatically measured by the air flow itself for all speeds and loads. This uniform operation is made possible by the air-bleed nozzle construction. For high speeds the gasoline, after passing the orifice F, is mixed with air taken through the bleeder G and holes in H to form a highly atomized mixture which is discharged through eight holes into the small venturi I. For low speeds the gasoline does not enter the venturi at all, but is taken through the hole J to above the throttle, entering through the idling jet K. The accelerating well M serves as a reservoir, which discharges on acceleration and refills on deceleration, without requiring any rich adjustment of the steady mixture.

There are three adjustments. A, the main adjustment, controls the gasoline supply from the float chamber, regulates the mixture through the whole driving range and

should be set so that the engine shows its best life and power. Turning nut A clockwise or to the right raises the needle and gives more gas; anti-clockwise, less. If an entirely new adjustment is necessary turn nut A anti-clockwise, thus lowering needle until it just seats, as shown by its sticking slightly when raised on lifting A, then turn A twenty-four notches clockwise, which should give a mixture somewhat rich. After starting and warming up this adjustment may be regulated as necessary for the best driving mixture.

The gasoline for idling is taken in above the throttle and controlled by dilution with air from the inside of the carbureter, as regulated by screw B, which should be between one-half and one and one-half turns to the left, or anti-clockwise, from the seating position. After the engine is warm this may be regulated as necessary, turning to the right, for more gas and to the left when less is required.

As the throttle is opened it will be noticed that at closed and wide open positions the nut A and needle E are stationary, but at positions corresponding to speeds from 10 to 35 m.p.h. the needle drops so that C rests on D. This function is based on the fact that a richer mixture is required for full power and wide open throttle than for closed throttle driving, when economy is the main consideration. The amount of this economizer action, or drop of the needle, depends upon the clearance shown at X and is controlled by the position of the pointer L, the extent of the action and consequent leanness of mixture increasing with the number of notches. To make this adjustment, retard the spark, open the throttle to about a 20-m.p.h. position and set the pointer one notch less than the thinnest mixture on which the engine will run steadily when warm. This will usually be the third or fourth notch.

Carburetion on Old Cadillac

Q.—My 1911 Cadillac is equipped with a model L Schebler carbureter. Will a pre-heating attachment or stove help this car to handle the low grade gasoline of today?

2.—Would it help to wrap the manifold with asbestos?

3.—Would some other carbureter give better results? What would you advise?

4.—Will anything be entirely successful.—A. J. Downer, Trenton, Ky.

1.—A suitable device for pre-heating the

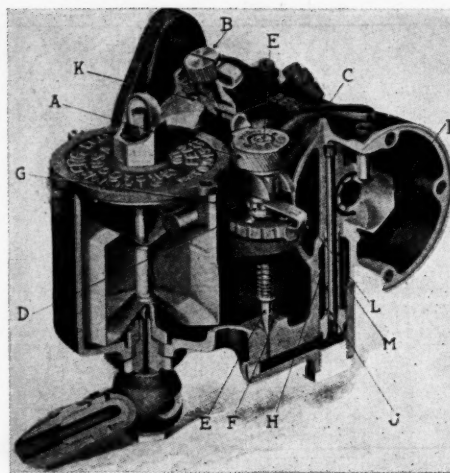


Fig. 4—Stromberg carbureter on Chalmers, showing adjustment

inlet air will aid a great deal, especially for winter service. The use of radiator and louvre covers will help maintain the engine temperature at the most economical point for winter conditions.

2.—No.

3.—The recent carbureters are designed to handle the heavier fuels and would probably give better results.

4.—Ideal carbureting conditions are hard to get into an old model, but you can help matters appreciably by making some of the changes mentioned.

The Electric System

Storage Batteries for Lighting Plant

Q.—I am operating a 60-volt lighting plant for our building, but have no storage battery. I am thus obliged to keep plant running even for a few lights at times. Would it be possible to use the storage batteries used for motor cars? There are three units of 2 volts each in each battery, and if I were to obtain the use of ten of these batteries from car owners could I not get satisfactory results with these thirty cells of 2-volts each?

2.—Would it not be an advantage to auto owners to place their batteries with me, or is there any danger of deterioration with moderate use?

3.—Is the charging rate of all makes of storage batteries the same?

4.—Would you consider the above plan advisable?—W. A. Reul, Wausaukee, Wis.

1.—In order to have this system work satisfactory it would be necessary to have

thirty cells of 2 volts each connected in series to some form of panel board so that they could either be charged when plant was running under a light load or discharged when plant is idle. In order to control the charging rate some form of theostat must be placed in the line. Motor car batteries will accomplish the desired result but it must be remembered that these are fully charged at a gravity of about 1.280 of the electrolyte instead of 1.210 as is customary for small lighting systems.

2.—Providing the rates of charge and discharge are not excessive there is no danger of damaging batteries.

3.—The charging rate must not exceed that necessary for the smallest capacity battery in the line as an excessive charging rate will cause battery plates to warp and thus produce a shorted cell. The charging rates for batteries vary with their ampere-hour capacity. Thus a 6-60 battery cannot be charged in excess of 4 to 6 amp. and a 6-120 battery in excess of 10-12 amp.

4.—There is no reason why it should not prove satisfactory.

Correct Spark Position on Buick

Q.—What is the correct position of the spark lever on a Buick D 45? I note that its position varies with the driver, some using a three-fourths advance and others full advance.—Ralph Lee Wagner, Cimmaron, Kan.

2.—There is no fixed position for the spark lever as the timing of each varies slightly. The proper position of the lever can best be determined from experience by driving the car. If the spark is too far advanced when accelerating the car, the peculiar noise known as spark knock will be heard. If the spark is too late, the engine will act sluggish. The average between these two conditions would be about the normal driving position.

Motor Fails as Generator

Q.—Why might the Northeast single-unit system, used on the Dodge, work as a starting motor but not as a generator? Brushes make good contact with commutator, but when the motor is running and cutout contacts are closed by hand the ammeter shows discharge.—N. E. Nelson, Hartford, Wash.

2.—This might be due to a blown-out generator fuse or high mica in the commutator. If the generator fuses prove to be all right, clean the commutator with No. 00 sandpaper. Examine the commutator and determine if the mica insulation bars are not too high. If this is the case these must be cut down as they prevent the brushes from seating properly.

High and Low-Tension Explained

Q.—Explain the difference between a high and low-tension magneto.

2.—Explain how to reassemble a magneto and secure the proper timing.

3.—Does the spark occur when the platinum points are open or closed?—J. Wilson, Victoria, B. C.

1.—The high-tension type of magneto has the primary and secondary coils wound on a common armature. The high-tension current is generated directly within the unit and is distributed from it to the spark plugs. In the low-tension type, the armature is wound with the primary coil only and the unit generates low-tension current, which must be carried to a high-tension coil separate from the magneto to have the voltage increased and from there returned to the magneto for distribution.

2.—The first step is to determine the di-

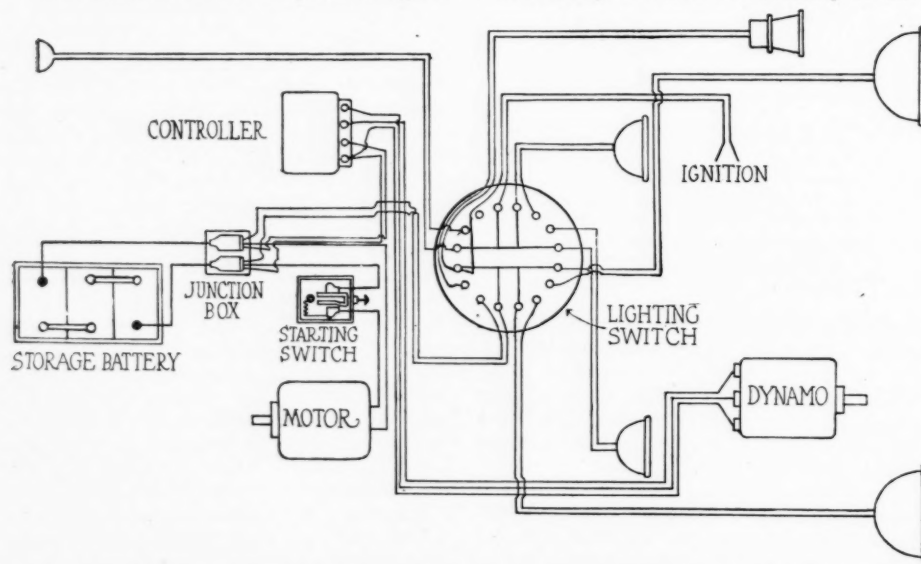


Fig. 3—Diagram of Ward-Leonard starting and lighting system as used on 1914 Henderson

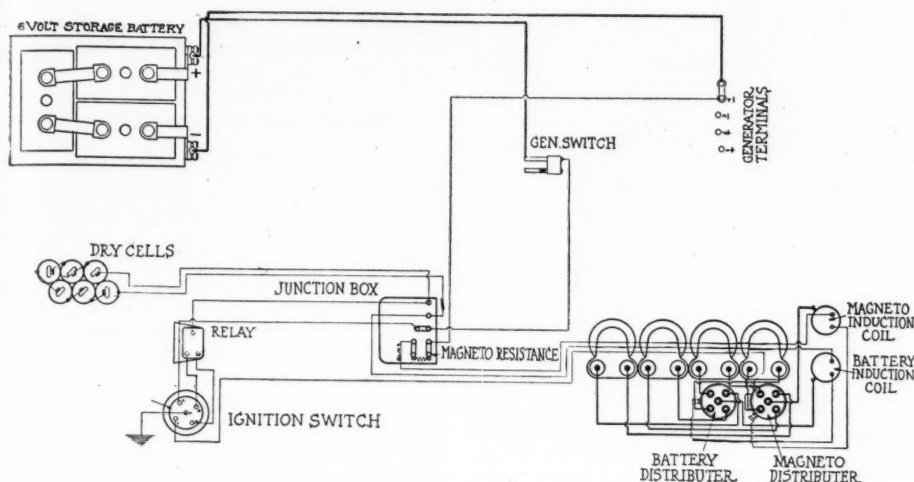


Fig. 5—Layout of ignition system as used on the 1913 Cadillac. Dry cells are used for starting

rection of rotation of the magneto, whether clockwise or anticlockwise. The reason for this is that magnetos are timed to run in one direction only. The break in the primary current should occur at the time when the edge of the iron armature segment is traveling away from the pole in the desired direction of rotation and in a line with the vertical center line passing through the magneto. This setting should be made with full retard with the distributor arm in the center of one distributor board contact segment. This is illustrated in Fig. 6.

3—The spark occurs in most magnetos at the time the breaker points open.

Wiring Diagram of 1913 Cadillac

Q.—Where can I get a diagram of the ignition system of the 1913 Cadillac?—Joseph B. Wells, Salt Lake City, Utah.

This is illustrated in Fig. 5.

Wiring of 1916 Kissel

2.—Publish wiring diagram of 1916 Kissel Kar, model 32.—William Yantsch, Dorchester, Wis.

This is shown in Fig. 7.

Wiring of 1914 Henderson

Q.—I have a 1914 Henderson equipped with Ward-Leonard starting and lighting system and would like to know how the wires are connected. Could MOTOR AGE publish a wiring diagram of this system?—G. V. Slack, Bloomington, Ill.

A diagram of this system is shown in Fig. 3.

Miscellaneous

Adjusting Klaxon Horn

Q.—How can a Klaxon horn, which seems pitched too high, be adjusted for tone?—J. F. Buck, Morris, Ill.

To adjust the Klaxon horn first loosen the locknut as shown in Fig. 10 and then start the current by pressing the button, in other words, sound the horn. While it is sounding unscrew the adjusting screw A until no sound is heard excepting the buzzing of the motor. Then turn the screw back until the note is loud and clear.

Remedying Loose Doors

Q.—Both front doors on my car are a trifle loose, caused by the tops of the doorway being too far apart. There is $\frac{1}{4}$ in. more clearance between the door and doorway than on the rear doors. Is there any way to remedy this?—Ralph Lee Wagner, Cimmarron, Kan.

3—The slackness from doors can be removed by installing new door bumpers.

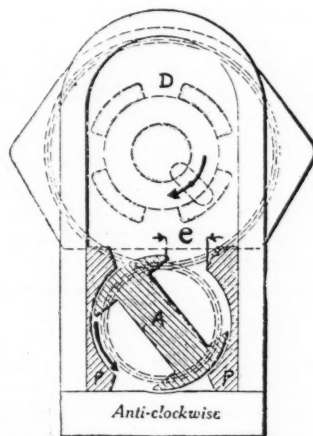


Fig. 6—Relation of armature to pole pieces when points separate

Also make sure that the bolts which hold the body to the frame are tight as this may have something to do with it.

Some Compressed Air Queries

Q.—Could enough compressed air be put into a tank $3\frac{1}{2}$ ft. long, 8 in. thick to inflate one or two 33 by 4 in. tires to 80 lbs.?

2.—How thick should a tank of this size be to carry 200 lbs. of compressed air?

3.—Have compressed air tanks ever been carried on any cars? Would they be dangerous?

4.—If tanks were installed on cars and arranged to be filled by a pump driven by the engine arranged to shut off and on at leisure would this be better than an engine driven pump?—H. N. E., Warren, Ind.

1.—Yes.

2.—About $\frac{1}{8}$ in., when made of steel.

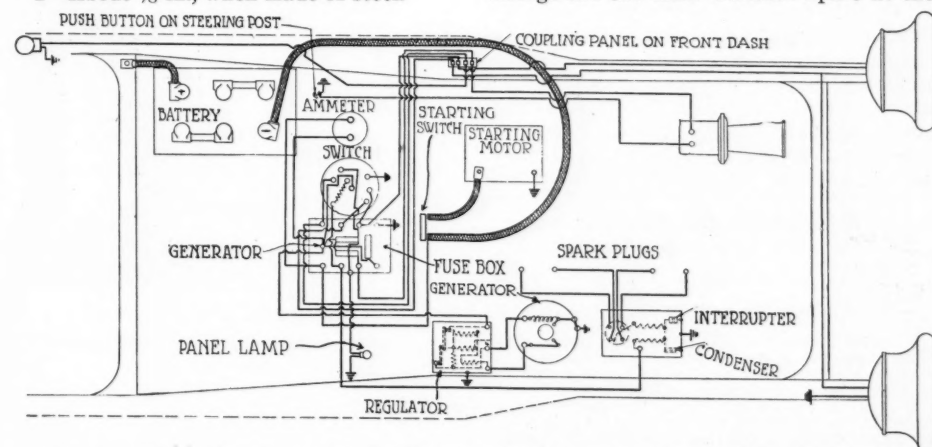


Fig. 7—Wiring diagram of the Westinghouse starting and lighting system of the 1916 Kissel Kar

3—Some of the first self-inking systems were of the compressed air types. They carried tanks larger than the one you mention.

4—The most feasible tire inflating arrangement would be an engine-driven tire pump. The apparatus you describe is too expensive, consumes too much space and adds considerable weight to the car.

No Organization Like This

Q.—Is there any publication or organization which tests out accessories and supplies for the benefit of the car owner?—George A. Ormerod, Miami, Fla.

We have no record of such an organization.

Oldfield's Twelve Still Building

Q.—What became of the twelve-cylinder aluminum engine built by Barney Oldfield? Did he break any records with it?—J. F. Buck, Morris, Ill.

Nothing has been heard of it for some time and apparently it is not yet completed.

Rittman Process Halted

Q.—What has become of the Rittman process of distilling gasoline?—N. E. Nelson, Hartford, Wash.

The development of the Rittman process is at the present time practically at a standstill. When Doctor Rittman donated this process to the public, it was specified that whosoever should develop and perfect the process would be compelled to make the results obtained public also. This condition is perhaps responsible for the lack of interest shown, as no one cares to go to the expense of the experimental work necessary when the information derived from them would become public property.

Testing Wheel Alignment

Q.—Is there an easy way of testing wheel alignment? I wish to check up on the wheels of my car before using it this winter and would like to know if it could be done without too elaborate an equipment.—T. W. Holmes, Chicago.

A quick way to test wheel alignment and one that does not require special equipment is shown in Fig. 8. Get four chairs or boxes and place them, one near each wheel, as shown. Then stretch a string from one front wheel to the rear wheel on the same side, holding the string down with a stone or weight of some kind. Measure from the string to the felloe of the wheel, not the tire. The front wheels should toe in slightly, so you must make allowance for this. Be sure also that the strings are the same distance apart at the

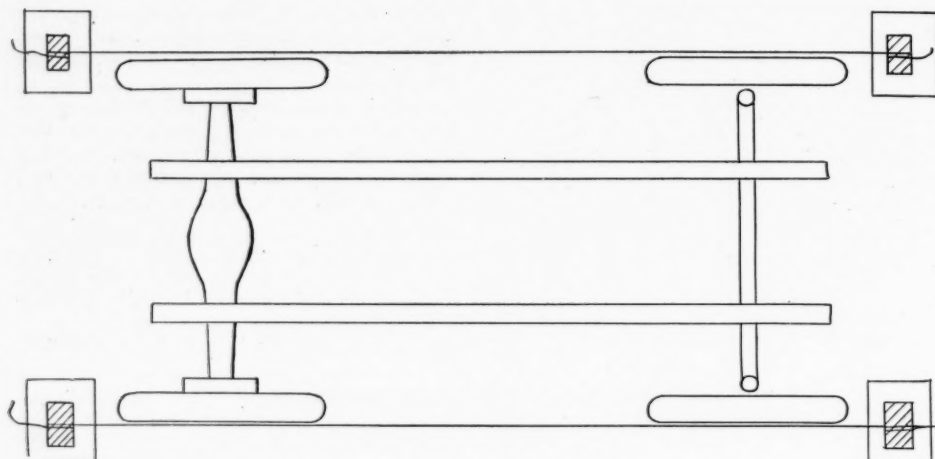


Fig. 8—Four chairs, two strings and several weights can be used to check wheel alignment

front and rear of the car. Have the string at such a height that it comes about in line with the center of the wheels. Measure the distance from the string to the felloe on each side of the hub. If this distance is not the same, obviously the wheel is out. On the front wheels the forward measurement will be a little larger than the rear, about $\frac{1}{8}$ in.

Adjusting Shackle Bolts

Q.—Is there any special way of adjusting rear shackle tire bolts to give easiest riding qualities to springs?—George A. Ormerod, Miami, Fla.

Shackle bolts should be adjusted so that there is no side play and yet not tight enough to interfere with spring action.

Noisy Transmission on Saxon

Q.—Explain the probable cause and remedy for noisy transmission in my 1917 four-cylinder Saxon roadster when driven faster than 20 m.p.h.—A. H. Denton, El Paso, Tex.

1—This may be due to a number of causes—want of proper lubrication, broken transmission gear tooth, loose transmission bearing or sprung main or countershaft.

Removing Water Spots and Stains

Q.—Before varnishing, how are water spots and stains removed? Is new varnish applied directly over old varnish without preliminary treatment? If spots won't come out, will they show up through new varnish?

2—Does use of gasoline in removing oil and grease stains injure finish?—George A. Ormerod, Miami, Fla.

1—New varnish cannot be applied over old varnish without first having rubbed old varnish with cotton stone to remove effects of weather from it. If the paint is badly checked through the varnish coat, in order to remove these marks it will probably be necessary to give the body a coat or two of color varnish before a finishing varnish can be applied.

2—Gasoline has a tendency to deaden and spot varnish. Kerosene is less injurious.

Some Steam Car Inquiries

Q.—Does steam make a more explosive mixture?

2—Must distilled water be used in the Doble steamer?

3—Must alcohol be used in the Doble in winter?

4—Will alcohol condense in the Doble condenser, or will there be some difficulty in condensing a solution of alcohol and water due to its low boiling, condensing point, etc?

5—Why is the engine on the Steamotor truck placed in the middle of the car? Is this as powerful as if direct to the rear axle as in the Doble touring car?—E. E. Pantzer, Sheboygan, Wis.

If a supply of oxygen present in a charge

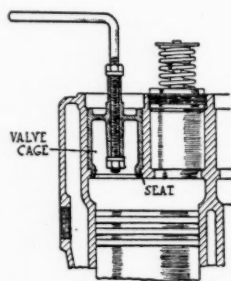


Fig. 9—Method of grinding Buick valve cages

of gas was insufficient, then providing the volume of water vapor added, was such as to produce an excess supply of oxygen, combustion would be more complete.

2—No.

3—No.

4—No.

5—The engine is probably mounted amids to balance the chassis. The truck

engine will exert the greatest effort at the rear wheels on account of the greater gear reduction.

Wants More Gasoline Mileage

Q.—I have a 1917 Cadillac touring car which averages about 9 miles to the gallon. My brakes do not drag, the compression is good, the carburetor is adjusted lean, and the motor in perfect condition. Is this all the mileage I can expect, or can anything be done to increase it?—E. E. Pantzer, Sheboygan, Wis.

We would suggest that you check the ignition timing. If this is a trifle late it will tend to decrease the miles-per-gallon of fuel considerably.

Cause of Humming Noise

Q.—What causes a hum in a Ford car, similar to that caused by the transmission brake? Differential is well oiled, also the universal joint.—Herbert Lagasse, Rice, Kan.

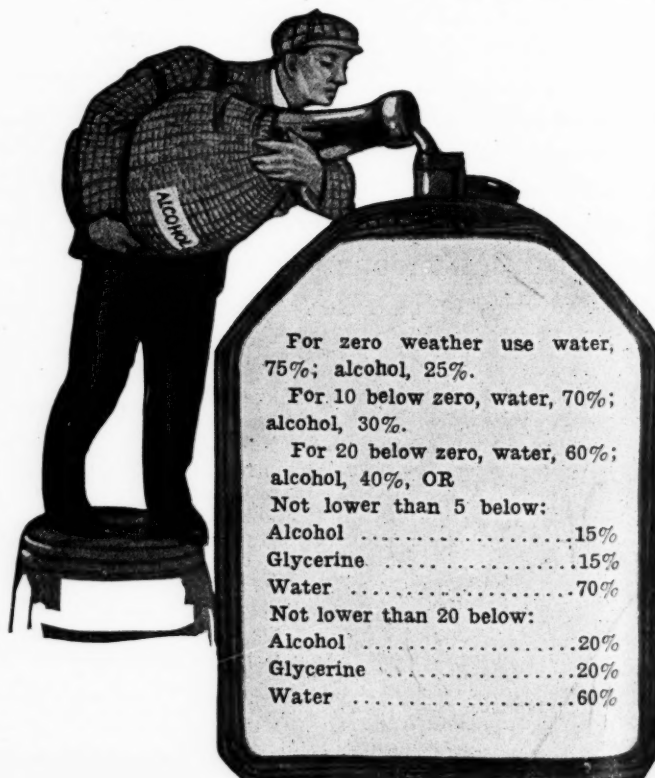
The humming noise you speak of may be caused by wear of the thrust washers placed in back of the ring gear on the rear axle. This would make the ring gear and pinion mesh improperly, thus setting up a peculiar humming noise which is sometimes transmitted along the driving members and seems to come from the transmission. A dragging brake drum on the transmission sometimes acts the same way, in that it holds one of the drums partially, allowing the gears in it to revolve. The remedy is to loosen the adjustment of the band. If the car has been driven considerable possibly parts of the transmission have become worn and such parts invariably produce noise.

Waste of Energy in Braking

Q.—What is the approximate pressure in pounds required to stop a medium-heavy car with the service brake, at a speed, say, of 45 m.p.h., providing the brakes are properly adjusted.—W. L. Butler, Bridgeport, Conn.

1—The energy used up by the brakes is lost beyond recovery in all gasoline-driven cars. If we consider a vehicle running 45

If You
Use
Alcohol
Add
to the
Solution
From
Time to Time
to
Allow for
Evaporation



For zero weather use water, 75%; alcohol, 25%.

For 10 below zero, water, 70%; alcohol, 30%.

For 20 below zero, water, 60%; alcohol, 40%, OR

Not lower than 5 below:

Alcohol 15%

Glycerine 15%

Water 70%

Not lower than 20 below:

Alcohol 20%

Glycerine 20%

Water 60%

m.p.h., then its kinetic energy per ton of car weight will be

$$K. E. \text{ per ton} = \frac{2000}{2 \times 32.2} \left(\frac{45 \times 88}{60} \right)^2$$

$$= 135,300 \text{ ft. lb.} = 67.7 \text{ ft. tons.}$$

Then due to rotational momentum we may add 5 per cent, making a total of 71 ft. tons.

Assuming that six-tenths of the total weight of car and load is carried by the rear wheels and that the ground adhesion is six-tenths then the distance necessary to bring car to rest will be

$$X = \frac{V^2}{2g} = \frac{(45)^2}{2 \times 32.2} = 187.5 \text{ ft.}$$

The result 71 ft. tons is for each ton of car weight and the distance required to stop is based upon the most efficient point of braking.

Charging Two Batteries

Q.—In charging a 6-volt battery through a lamp bank resistance at a rate of, say, 6 amp., if I connect another battery with it in series to charge them both at the same time and at the same charging rate, will I have to add more lamps?

2—Can I charge a 6-volt and a 12-volt battery at the same time?

3—In charging a 12-volt battery, do we use the same amount of lamps as when we charge a 6-volt battery at the same rate, or are not as many needed?—Oliver Sveir, Minneapolis, Minn.

1—If you are charging a 6-volt battery through a lamp resistance from a 110-volt circuit and then connect another 6-volt battery in series with the one already in circuit, the current flowing will be reduced by about 10 per cent. This could be made up for by adding one more lamp to the rack.

2—It is quite possible to charge a 6-volt and a 12-volt battery at the same time in the same circuit. Of course, adding on a 12-volt battery to a 6-volt battery the current will be somewhat reduced, possibly 20 per cent. This can be made up for by adding more lamps.

3—If you charge a single 12-volt battery on a 110-volt circuit, the current will be slightly less than if you charge a 6-volt battery on the same circuit and use the same number and size of lamps. The difference will be about 10 per cent.

Valves

Reseating Buick Valve Cages

Q.—Explain by drawing the correct way to grind Buick valve cages. Should an abrasive be used? If so, should it be placed under or around the cage?—Franklin LeCates, Princess Ann, Md.

Fig. 9 illustrates a simple method of grinding Buick valve cages. Install a threaded piece of round iron stock through valve guide and then tighten the nuts.

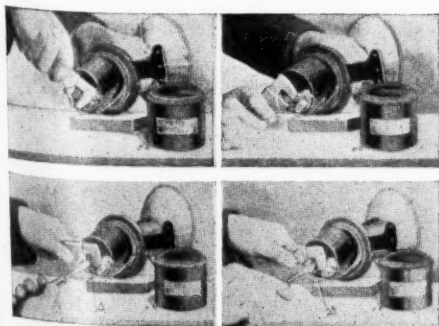


Fig. 10—How pitch of Klaxon horn can be varied

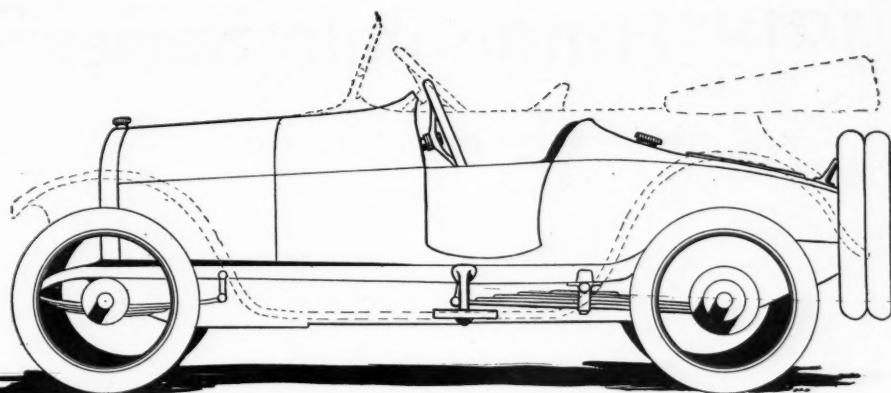


Fig. 11—How an Overland Country Club model might be converted into a trim-looking speedster

Using the bent part of rod as a handle the cage can be rotated easily. Use a very fine valve grinding compound as an abrasive.

Valve Mechanism Explained

Q.—Publish cross-section view of the average valve operating mechanism. I should like to get a clear conception of the location of the cam, push rods, etc. I have often seen these things referred to and would like to see how the parts work in relation to each other.

2—How are the valves oiled on the Duesenberg racing cars?—A. W. Hartford, Chicago.

In Fig. 12 you will find a diagram showing the layout of the various parts that make up the mechanism of an average poppet valve used in motor car engines. Note that the valve is in the closed position and held down by the coil spring which surrounds it. At the bottom of the spring is a washer, held to the valve stem by a pin or other locking device. The spring rests on this washer.

At the bottom of the diagram is the cam, a sort of pear-shaped device made integral

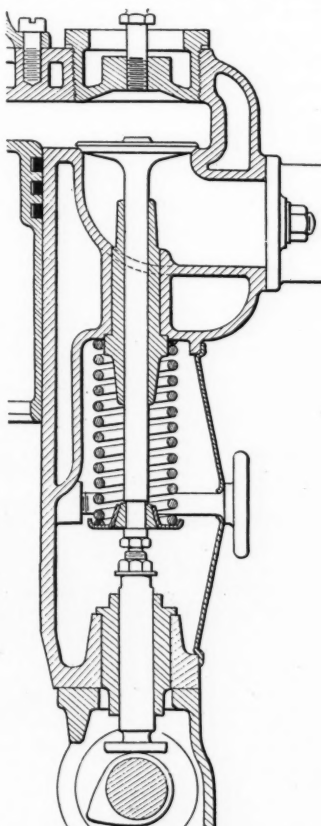


Fig. 12—Typical poppet-valve installation

with the camshaft. The push rod or tappet is made with a wide head that rests on the cam as shown. Between the end of the valve stem and push rod are the adjusting nuts or screws by which the proper clearance is obtained. If the cam shown is rotated in a clockwise direction the raised portion of it will force the push rod up and this in turn opens the valve against the spring, compressing the latter. When the cam descends, the push rod drops with the spring forcing the valve on its seat again.

2—The valves on the Duesenberg engines, like the valves on many other engines are oiled by the mist that comes up from the crankcase through the valve compartment. The latter is fitted with cover plates to keep the mist from getting out.

Valves in Racing Cars

Q.—What percentage of racing cars use the camshaft on top of cylinders?

2—Do any of them use valves in cages?

3—Has the Hudson company used a valve-in-head type of engine in racing the past two seasons?

4—Does Fiat use a valve-in-head engine for passenger cars?—Charles H. Prior, Pasadena, Cal.

1—We do not know the exact percentage but practically all racing cars are of the valve in the head type with overhead camshaft.

2—The valves in most racing engines are seated directly in the cylinder head, although some have them in cages.

3—The Hudson racing engine is of the L-head type similar to the stock product.

4—The present Fiat engine is of the L-head type.

Rebuilding

1917 Overland Into Speedster

Q.—Publish a sketch showing a 1917 Overland Country Club roadster converted into a speedster of a low design.—C. B. Atno, Littlestown, Pa.

A suggestion for this is shown in Fig. 11.

Underslinging Ford Frame

Q.—Explain method of shortening the driveshaft to permit the rear spring arrangement, suggested in answer to H. C. Meng's query, "How can I undersling my Ford speedster?" Sept. 27 issue.—J. H. Kendel, Chicago.

It will not be necessary to shorten the driveshaft in this case. By lowering the frame as suggested, the rear spring will be placed ahead of its normal position, so that the spring seats on the axle and ends of the spring will not line up. We have seen this overcome by the use of short steel rods placed in the spring perches or seats and hanging the spring from this rod by suitable links.

1918 Hupmobile Series Entirely New

Four-Cylinder for Coming Season Designed to Be Lower Priced

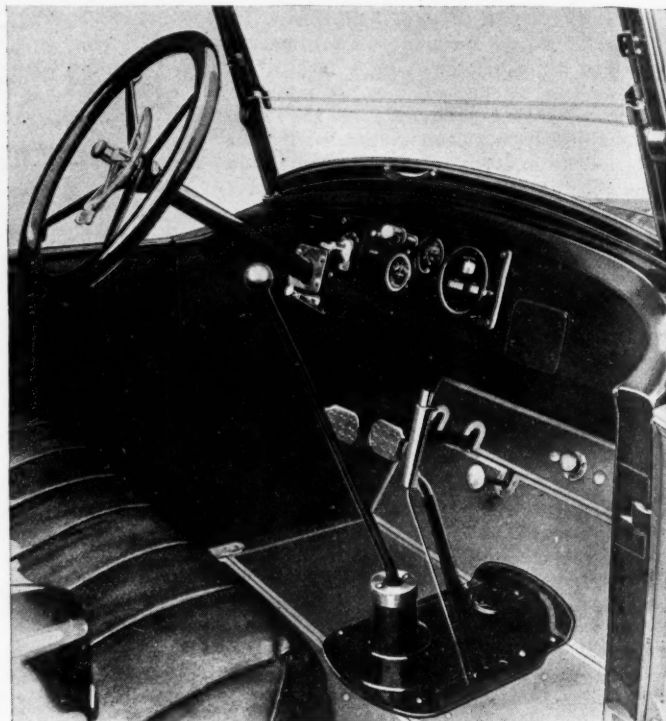
ONE of the few entirely new cars brought out this year by a concern of long standing is the Hupmobile Series R, supplanting the four-cylinder car used during 1916 and 1917, which was known as Series N. The new Hupmobile is also a four-cylinder car, designed to have the same performance and quality as the Series N but to be somewhat lower in price. It is a smaller car in point of wheelbase, but from the standpoint of room it has an equal amount in the tonneau as the five-passenger car of last year and an increased amount of leg room in the forward compartment, due to a shorter engine and the elimination of the cowl tank. Both models will be \$1,250.

Differs From 1917

Differing throughout from its predecessor, the new Hupmobile has a new engine, new transmission units and even in appearance there is very little to connect it with the preceding design. The test cars have been on the road for nearly two years, and the new car is stated by the manufacturers to out-perform the preceding model, although it has only a 112-in. wheelbase as compared with the 119-in. on the Model N.

This model, having been developed during period when the material market has undergone a tremendous upheaval, represents the latest word in the industry as regards securing the maximum possible performance and at the same time bringing the price of the car into the field where

Driving compartment of the Series R Hupmobile, which provides 2 in. more leg room than the preceding model, although the wheelbase is 7 inches shorter than that of the old series

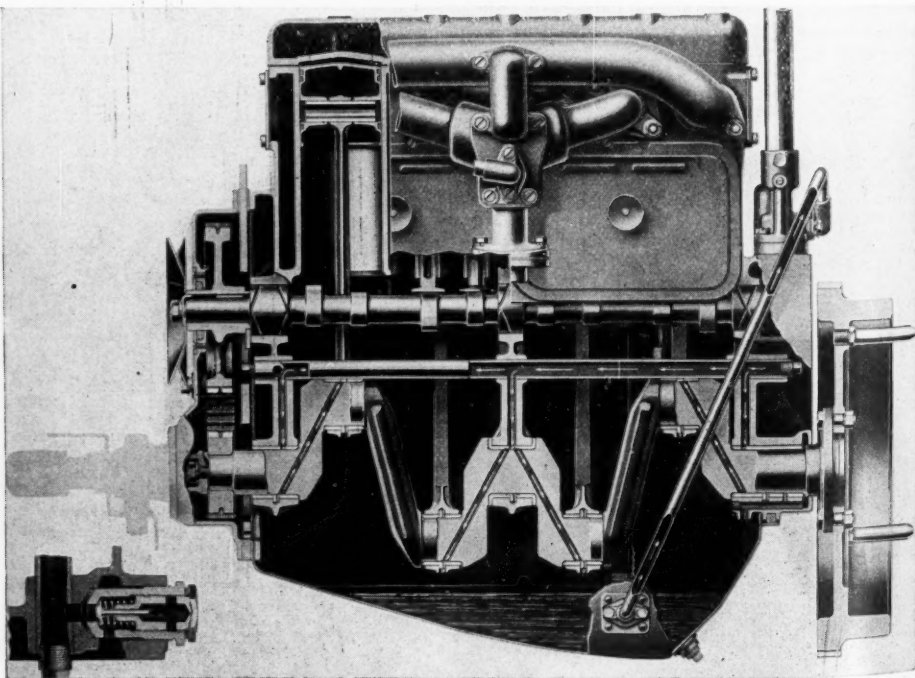
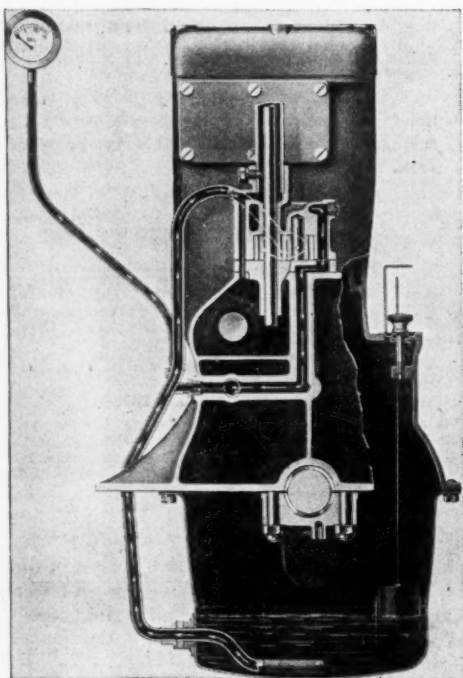


production on a large scale can be maintained.

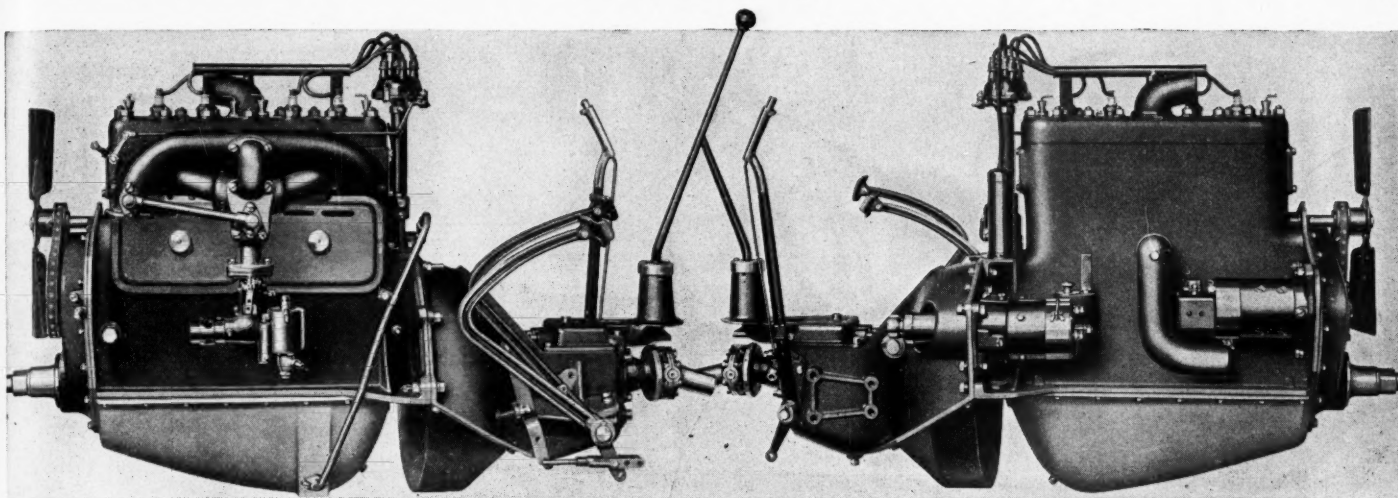
Like previous Hupmobiles, the car is low-hung, having no break in its lines from front to rear. The hood line is straight and merges directly into the side line of the car, so that there is a straight line from the top of the radiator to the back of the rear seat. The windshield is sloping and the finish on the hood, fenders and running gear is hard-baked black enamel. The body is blue, of a somewhat brighter

color than that of last year. The upholstery is leather in French plaits, fastened on all edges with a leather covered molding. The entire body is lined.

Several of the features are new to Hupmobile practice, and there are those which exemplify the trends in engineering development to take care of the problems presented by the present grade of fuel. Probably the most important development on the car is the complete hot-air arrangement to aid in the proper vaporization of



Transverse section through engine left, showing path taken by lubricant in pressure oiling system. Cutaway view of engine, showing course of oil in the oiling system



Left side of Hupmobile powerplant, showing carburetor and manifolds, left, and right side of engine, showing detachable head and mounting of starter and generator

heavy gasoline. The new arrangement is so designed as to preheat the initial air entering the carburetor to a degree proportionate to the exterior temperature. In addition to preheating the primary air the mixture itself is heated before entering the intake gallery. Referring to the sketch, it will be noted that there is a winter and summer position on the damper controlling the preheating of the primary air. This is controlled by a lever and allows either all cold air or preheated air to enter the carburetor in accordance with requirements. Above the carburetor the intake is exhaust-jacketed, preheating the mixture before it enters the cylinder.

Cooling Precautions

Precautions have been taken to have the driving compartment cool in the summer time. The exhaust pipe is carried forward from the engine and brought around, well away from the body, so that there is no possibility of heat entering the driving compartment. To make it doubly sure that no engine gases can pass through the floor boards, an ingenious arrangement has been placed on the pedals in the way of rubber sealing disks, which are shown in the sketches. These disks come against the bottom of the floor boards when the pedals are in the up position, acting as valves and shutting off the passages of any gases through the floor boards.

Elimination of the bottom pan, or plating, beneath the engine, is an unusual feature. The pan is carried back only for a short distance and then curved down in such a way that any mud which might be splashed from the front wheels is turned away from the engine. This is another factor in keeping the front compartment cool and also aids in keeping the temperature for the oil low. The employment of vacuum feed in place of the cowl gravity tank used in the previous model eliminates any chance of the odor of gasoline entering the front compartment and also permits of an increase of 2 in. in leg room for the driver.

As in all Hupmobile models the engine is a four-cylinder design, the cylinders being cast in a single block in unit with the crankcase, but the powerplant differs in many respects from anything used in previous Hupmobile practice. The head is detachable, this being a new departure for

the Hupp company. It will be noted that the water space is particularly large around the valves. Bore and stroke are $3\frac{1}{4}$ by $5\frac{1}{2}$.

Pistons are cast iron of the hour-glass type. They are light with a ribbed section to maintain their stiffness and rigidity. Two rings are used, one in the top and one in the bottom below the wrist pin. The oil wiper ring at the bottom of the piston serves as a check in preventing the oil from leaking into the combustion chamber.

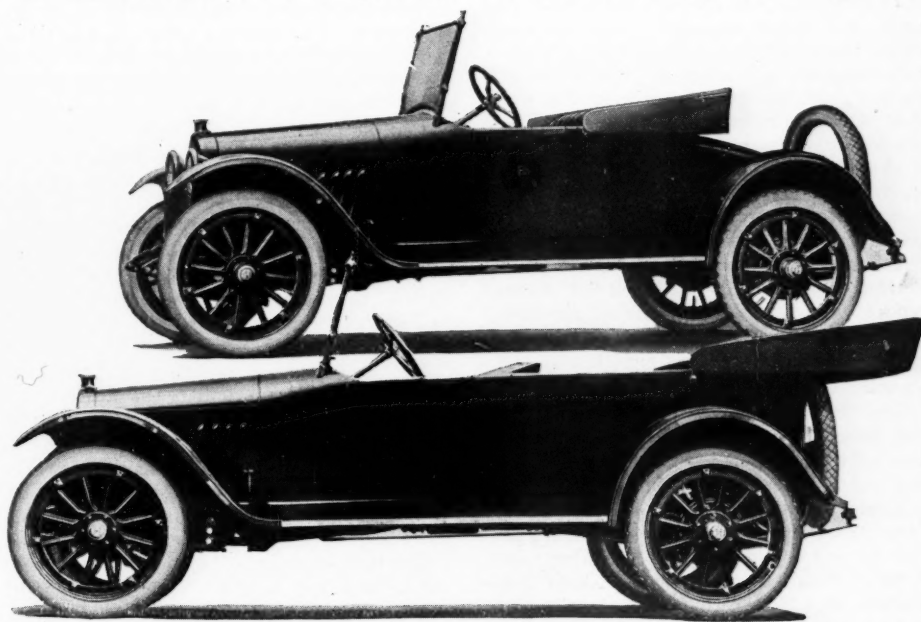
In unit with the cylinders is the crankcase casting, which also supports the engine, the supporting points being three in number, the front support being a special design with a packing included to absorb the vibration. This packing is inclosed in a ring which forms a part of the supporting member, and the construction is illustrated in the engine section which is shown here.

Connecting-rods are I-beam forgings, machined for lightness and balance. The crankshaft is carried on three phosphor bronze bearings, having a high-speed bab-bitt lining. The camshaft is driven by silent chain contained in a casing in the

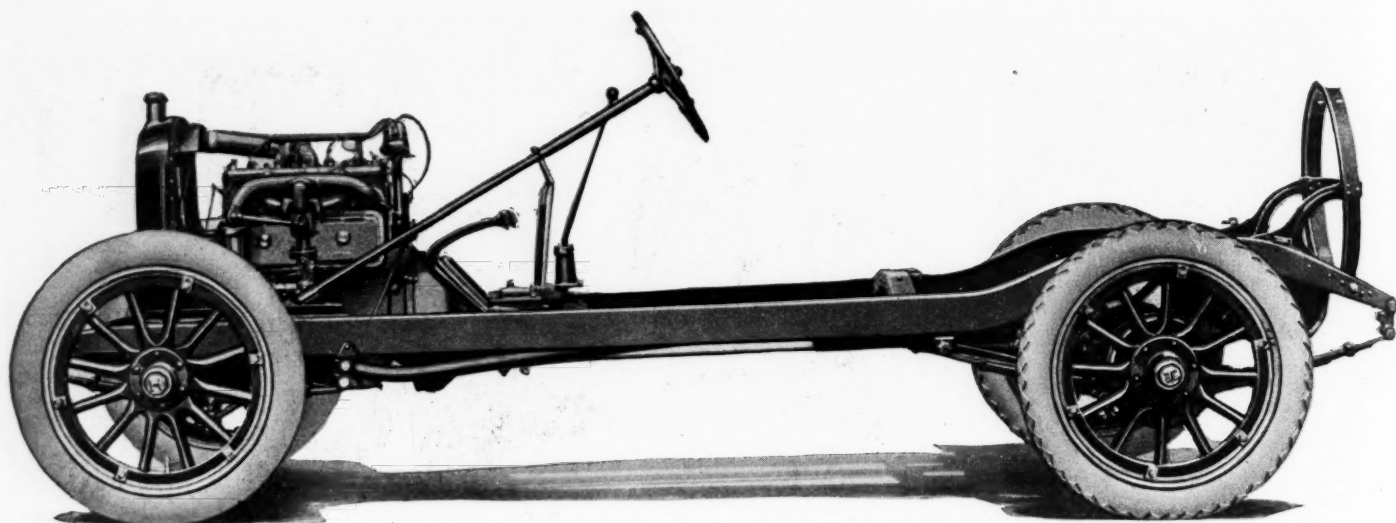
front end of the engine. It is carried on three bearings.

Valve followers are mushroom type, the tappets being hollow. The valves are forged in one piece from alloy steel. They have a diameter of $1\frac{1}{8}$ in. clear and a 45-deg. seat. The tappets are assembled with the guides as two units and readily can be removed by taking off the valve cover plate, which is held in place by knurled screws, and taking out the cap screws which hold the assembly in place. The valve covers inclosing the valve action act as breathers, so that oil vapor breathed from the crankcase surrounds the valve action, keeping these parts constantly lubricated.

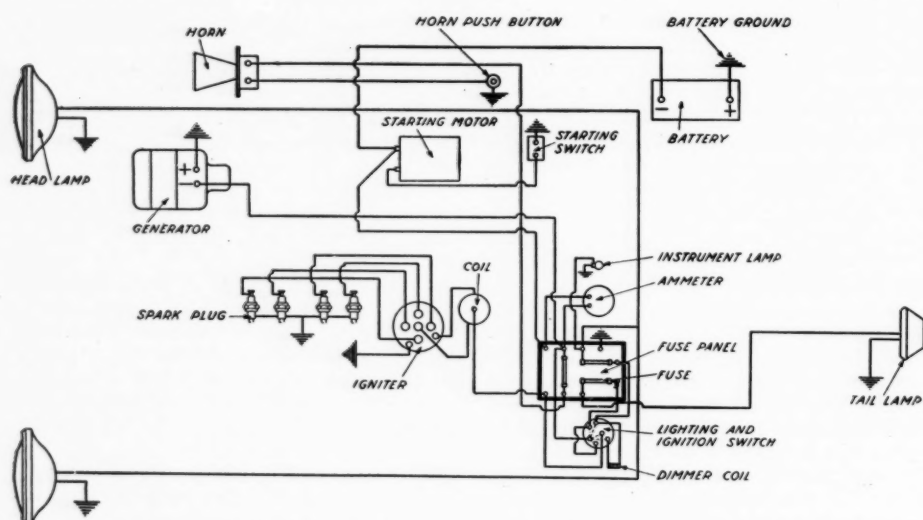
A pressure-feed lubricating system of an entirely new design is used in which there is no splash to any of the bearings. The oil is circulated by a gear pump driven from the camshaft. The pump delivers the oil directly into a long, horizontal lead which has independent feeds to each of the three main bearings. At the main bearings the oil enters the leads which are drilled through the crank cheeks, and through these leads the oil is carried to the lower connecting-rod bearings. The



Hupmobile Series R roadster, which has a seating capacity of three, above, and side view of the Series R Hupmobile touring car



Hupmobile Series R chassis on which are mounted the roadster and touring bodies. Note the high shifting lever



Wiring diagram of the Series R Hupmobile with Bijur starting and lighting system

leads are drilled directly through to the outside ends of the rod bearings, and from this point any excess oil which is thrown off lubricates the other internal bearings of the engine. The pressure is direct to the main and lower connecting-rod bearings, while the cylinders, piston pin, camshaft and tappets are oiled by the lubricant thrown from the crank bearings. The camshaft chain is lubricated by overflow from the oil-pressure relief valve. A strainer is placed in the oil pan below the connecting-rods so that all the oil dropping back to the reservoir must pass through it, and an oil pressure gage is carried to the instrument board, while the level of the oil in the crankcase is indicated by a float type of gage, visible on raising the hood. This is an improvement over the style of gage used in the previous model.

Stewart Vacuum System

The Stewart vacuum system supplies fuel from the 15-gal. tank which is at the rear, of which 2 gal. are reserve. There is a gage on the gasoline tank and a fuel strainer screen on the tank end of the pipe lining. From the Stewart vacuum tank the gasoline flows by gravity to a Stromberg carburetor with the hot-air provisions mentioned. In addition there is a starting control operated by hand.

Ignition is by the new Atwater-Kent

closed-circuit type of battery system. The coil and distributor are located in the rear of the engine, where they are in a protected position, and the wiring is carried from the distributor to the wiring is carried from the container. The ignition switch is combined with the lighting switch and is located on the instrument board, with a lock arrangement to protect the car.

Cooling is by thermo-syphon, the radiator capacity being increased in proportion on the new engine. The radiator and engine have a water capacity of $5\frac{1}{2}$ gal. on this model, and the fan is a two-blade airplane type running on ball bearings driven by a V-belt from a pulley wheel mounted on the end of the camshaft. There is a sliding tension adjustment to prevent slippage of the fan belt.

For lighting and starting the two-unit Bijur system is employed, the system operating at 6 volts, and is wired on the grounded-return system. The generator is driven by a silent chain from the crankshaft, the chain tension being adjusted by rocking the generator. The automatic cut-out relay switch is in a sealed box on the end of the generator. The Bijur starting motor is mounted in the clutch housing and engages the flywheel by an automatic screw shift connection, electrically operated. With this mechanism, the starter is disen-

gaged even though the pedal is held in place.

As regards lamp equipment, there are 15-cp. head lamps, tail lamp and instrument lamp. The instrument lamp has an individual switch so that it may be turned on and off independently. The fuse box also is located on the instrument board, and there is space for a spare fuse. The battery is a Willard 90 amp.-hr.

Clutch and gearbox are a single unit bolted to the powerplant. The clutch is a dry-disk type having seven steel plates each $9\frac{3}{4}$ in. in diameter, faced with asbestos fabric and operated by six springs. The clutch parts are inclosed in the housing to keep them free from dirt and dust. The clutch pedal is so arranged as to give a very light action and is adjustable for length of movement, position and pressure. The clutch shaft is operated on annular ball bearings. The gearset has three speeds forward and has ball bearings on the spline shaft and plain bearings on the countershaft.

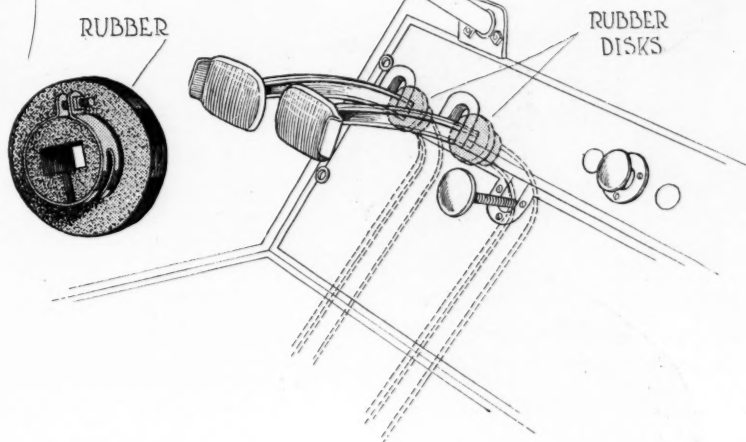
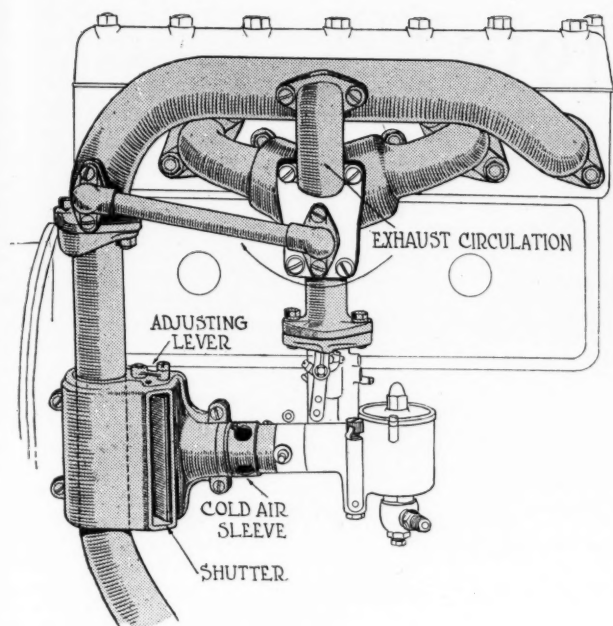
Lowered Gearbox

One of the features of this car which is different from the previous Hupmobile is that the gearbox has been so lowered as to put the top of it on a level with the floor boards, giving more foot room and clearing out the front compartment.

Another unusual feature which distinguishes the shift is in the length of the shifter lever, which is a cane type, 24 in. long, bringing it in close proximity to the driver's hand. The emergency brake lever which is carried on the side of the gearbox provides an unusual powerful leverage, and a feature of the lever is the ease of operating the latch to disengage the brakes.

From the gearbox the drive is taken through two universals and a tubular propeller shaft to the floating rear axle. The wheels are attached to the shafts with paper fits and keys, and the driving gears are the spiral-bevel type with a ratio between the ring gear and the pinions of 4.91 to 1. The pinion bearings are taper rollers, and the gear and shaft bearings are Hyatts with ball thrust bearings.

All brake linkage rattles are guarded against by the spring tension on the bearing spaces. Underslung rear springs are used, both front and rear springs being



Complete hot-air mixture-heating system used on the Hupmobile Model R, left, and Hupmobile pedals provided with rubber plug to seal holes in foot boards

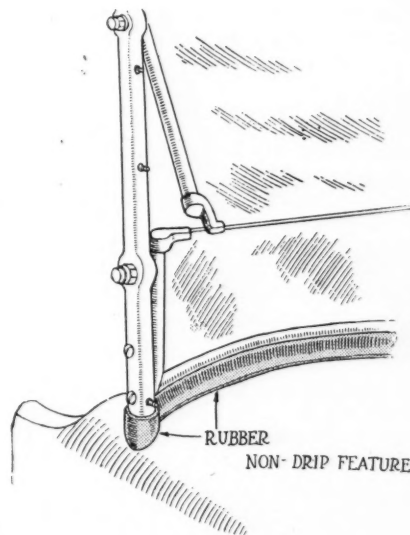
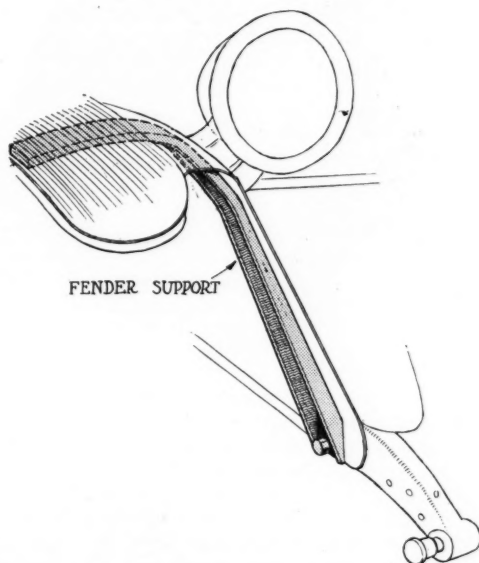
semi-elliptic. The front springs are 36 in. long and the rear springs, 51 in. long. A Jacox steering gear is used, this being worm and nut type with 17-in. wheel.

A five-passenger touring and a roadster are supplied in the Series R. These bodies are made of sheet metal over wood frames. The fenders are particularly noticeable in that an inverted U-section beam bolted to the front end of the frame supports the fender construction, and the material used is heavy gage sheet steel. The five-passenger body is a conventional design, with a continuous front seat. The roadster is a single-seat type and will accommodate three people. Beneath the rear deck is a compartment which will accommodate three suitcases.

Standard equipment of the car includes a Neverleek top, with black exterior and tan interior. The curtains are the Bishop style, opening with the doors and folding into the top when not needed. The windshield is a rain vision, non-drip type with overlapping top glass and ventilating lower glass. There is a Van Sicklen speedometer, gasoline gage, motor-driven horn, ammeter, foot rail, robe rail, tonneau carpet, tire carrier, etc.

BODY RESTRICTION HURTS TRADE

Sydney, Australia, Sept. 25—The embargo against importing motor car chassis with bodies, which was put into effect Aug. 10, has been creating great injury to dealers in Australia, due to the fact that there is not sufficient body-building capacity in Australia to furnish the necessary bodies for the chassis which the dealers can sell. Because of this situation the government modified the original ruling, permitting the fitting of cowl dashes, foot boards, mudguards, windshields, hoods and other parts and admitting them as a part of the chassis. A still later modification permitted of shipping a percentage of chassis with bodies. This has not met the requirements, and it is estimated that it will be twelve to eighteen months before body builders in Australia will be in a position to furnish all



Left, rigid inverted U-section supports for the fenders, and right, new type of windshield with rubber non-dripping feature on new Hupmobile

bodies needed. In the meantime dealers are confronted with the problem of perhaps having their money tied up with chassis which they may carry in stock for a year or longer until such time as bodies can be secured.

Many overtures have been made to the Australian government by the dealers drawing attention to the great expense it will place on them due to not being able to get bodies. But the body builders in Australia are facing difficulties other than mere lack of capacity. They started using steels not suited for body construction as the metal cracked and failed to withstand ordinary use. The lack of shipping space already is seriously handicapping the body-building trade.

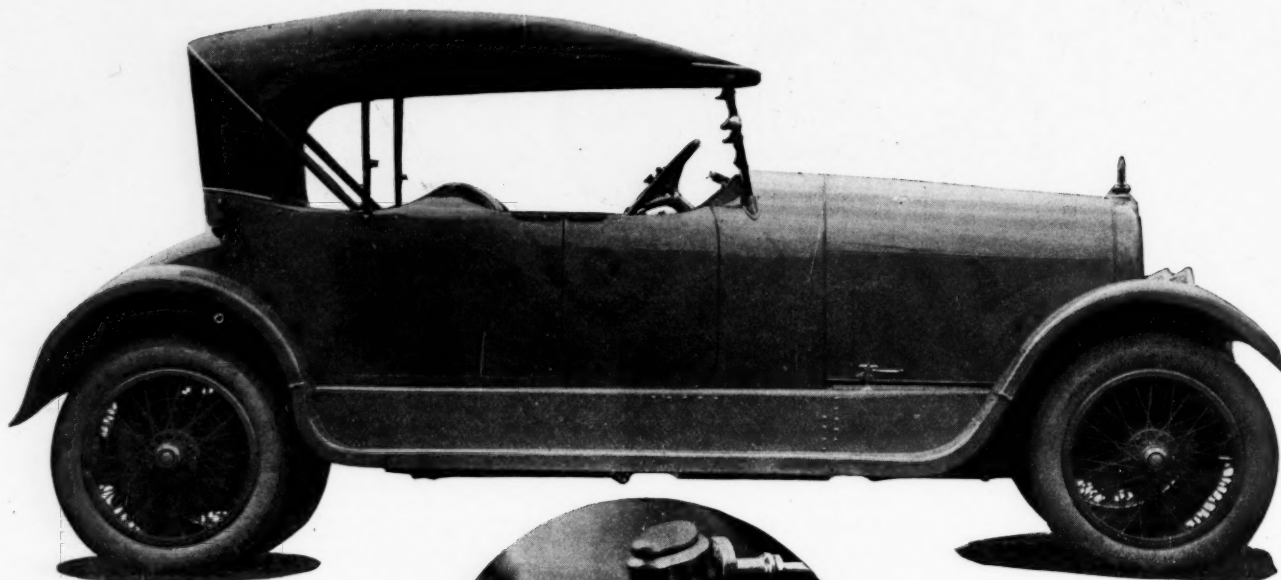
Some interesting information has been furnished on motor car conditions a year ago. The second half of 1916 being especially wet, buyers deferred their purchases until the roads were in good condition. The farmers were not advised until a late date

concerning the government's intention in payment for the 1917 crop and held out purchasing until this was settled. The government took over the wool clip, and stock farmers deferred purchasing of cars until wool prices were announced. To this might be added the coal strike in November. The natural consequence of these delays came with a rush of business in the first quarter of the present year, which made up for the slump of the previous year. Many dealers soon found themselves out of stocks. It has been due to the many overtures made by the Australian dealers that the government recently has modified its rulings.

NEW HACKETTS SOON

Jackson, Mich., Nov. 6—The Hackett Motor Car Co. will announce a touring sedan and a three-passenger coupe soon. It is expected that the plant will be moved to Grand Rapids, Mich., in the spring.

Refinements Mark 1918 Marmon



Marmon four-passenger model,
which sells at \$3,550

NUMEROUS refinements are in evidence on the new series Marmon, which like its predecessor will be known as the 34, the latter based on the S. A. E. engine rating. Important features, such as the aluminum engine, special frame and running board construction, graduated rear cross springs, etc., have been retained. In looks, the new model resembles closely the preceding, but the outline of the rear seat has been changed somewhat, resulting in a reduction of the inclination of the rear-most part of the top line. The division between the front seat has been eliminated, a plain double seat being substituted. The windshield in accordance with latest practice now slopes backward at a 10-deg. angle. The mounting of the latter is unusual. Instead of supports terminating at the cowl, they extend down to the main frame channels. Other small changes include a plain bearing fan instead of the ballbearing type, magnetic tank gage, one key for switch, gear lever and tool box locks, tonneau light and glass window in top.

Increased Prices

There has also been an increase of prices on all models, as follows: Seven-passenger touring car, \$3,550; five-passenger touring car, \$3,500; four-passenger roadster, \$3,550; non-convertible sedan, \$4,950; limousine, \$5,250; town car, \$5,250; landaulet, \$5,350. In addition to its standard bodies the Marmon company is in a position to furnish cars with special designs of closed bodies by Rubay at the following prices: Limousine, \$5,750; town car, \$5,700. For the benefit of those who may wish to have bodies built to their own specifications, the company offers the chassis without body, with instrument board and instruments fitted, front and rear fenders, hood, starting and lighting systems, lamps, standard chassis equipment, tools, etc., at \$3,200.

Change in the engine design has permit-



Stock equipment on the Marmon
includes a locking device

ted of dispensing with the sheet metal side plates on both sides. These plates formerly covered openings in the cylinder jacket and in valve rod chamber. The cylinder block is now cast without them. Marmon now is manufacturing the radiator fan itself, and instead of the ball bearing, which occasionally gave trouble, a plain bearing fan has been adopted. The fan hub is in the form of a drum which forms an oil reservoir. A sort of cam is secured to the stationary shaft, and the fan hub in its revolution carries the oil around to the upper side of this cam, against a wall or dam thereon. Just in front of this dam is a hole drilled to the center of the shaft. The shaft is bored out axially and radial holes place the center hole in the shaft in communication with the two bearing surfaces of the fan hub. Hence a comparatively large supply of oil can be carried in the hub, and oil constantly is fed to the bearing surfaces while the engine runs. The thermostat formerly supplied as regular equipment has been dispensed with and instead a Moto-Meter now is fitted. The thermostat can be supplied, however, on special order.

Instead of Bosch starting and lighting system heretofore used, the Bijur system will be regular equipment in 1918. The starting motor is held in place by a strap fastening and is geared directly to the engine flywheel by the new Bijur screw-

shift drive. The Bosch magneto is retained for ignition and is driven through the Bijur generator. A feature not absolutely new but introduced during the latter part of last season is vacuum control of the oil feed. As is well known, Marmon was the pioneer in force-feed lubrication in this country and consistently has adhered to it. The lubricating system generally is adjusted in a new engine to give an oil pressure of 15 lb. per square inch on the bearings. When the engine is throttled down very low this results in a much greater oil supply to the bearings than is actually necessary, with the result that there is a tendency to carbon formation and waste of oil. This has been overcome in the new Marmon by a vacuum-operated valve, which when the vacuum in the intake manifold exceeds a certain value opens a bypass in the lubricating system, so that only the pressure due to a head of less than engine height remains on the oil.

Lubrication System

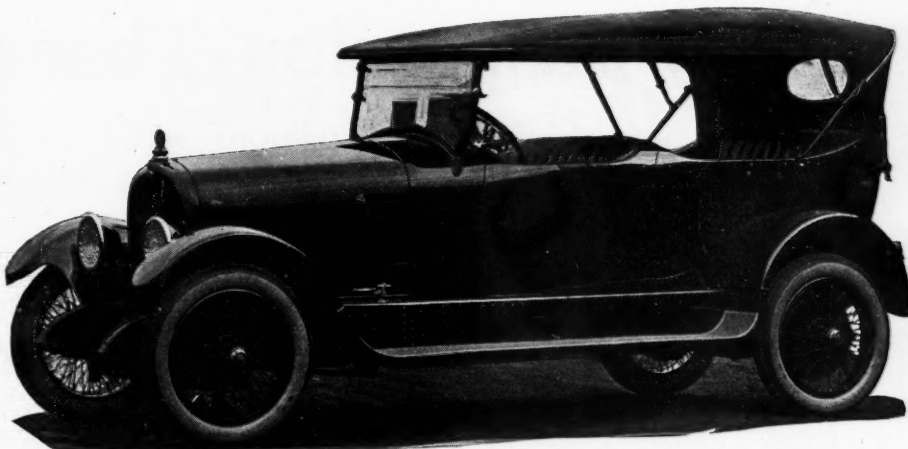
In the Marmon lubricating system oil is supplied through a filler on top of the engine and passes down around the valve push rods into a large capacity cast aluminum oil pan, which is cooled by ribs along the base. From this sump oil is drawn through a gauze strainer into the gear pump at the rear end of the camshaft. This pump delivers oil into the main feed pipe under pressure, the amount of pressure being indicated by a gage. By a vacuum valve this pressure is reduced automatically at low engine speed. The upper part of the valve chamber communicates through a small pipe with the inlet manifold. Within the valve chamber is a piston valve which is forced downward by a spring above it. The suction in the intake manifold, however, tends to lift the valve, and when it becomes sufficiently great to overpower the spring the valve is lifted and communication estab-

lished between the delivery side of the oil pump and the oil sump. This removes all pressure from the oil system, except that due to the head of oil determined by the highest point of the bypass line. Oil is conducted from the main feed pipe to the center of each of the four main crankshaft bearings. A circular groove around the bushing thus is filled with oil under pressure, from which it spreads over the whole bearing surface. Oil also is forced into the hollow crankshaft and through same to the crankpin bearings. The throw-off from the crankshaft lubricates the cylinder walls and piston pins. The piston is provided with means for scraping the excess oil from the cylinder walls. The maximum pressure in the main feed pipe is limited by a ball check valve which is adjustable without removing the engine cap. The excess oil passing through this check valve circulates through the hollow rocker arm shaft, lubricating the valve rockers and contacts. Oil which escapes from this shaft flows down along the valve push rods into an oil container above the valve tappets, cams and camshafts, providing a constant head of oil for these and also for the camshaft gears.

Clutch Design Changed

A change has been made in the design of the clutch throw-out, which is now provided with a felt washer soaked with oil so that it always will be supplied with lubricant. The change gear lever, which is of the ball-ended type, is now provided with a lock to permit locking it in the neutral position. The key for this lock also is used for locking the tool compartment in the left front door, and, in fact, only a single key now is required with the car. The tools are held in pockets on the door of the compartment, which swings downward and is held in a horizontal position by two chains.

A new lighting switch is fitted to the instrument board. In what may be referred to as the neutral position of the



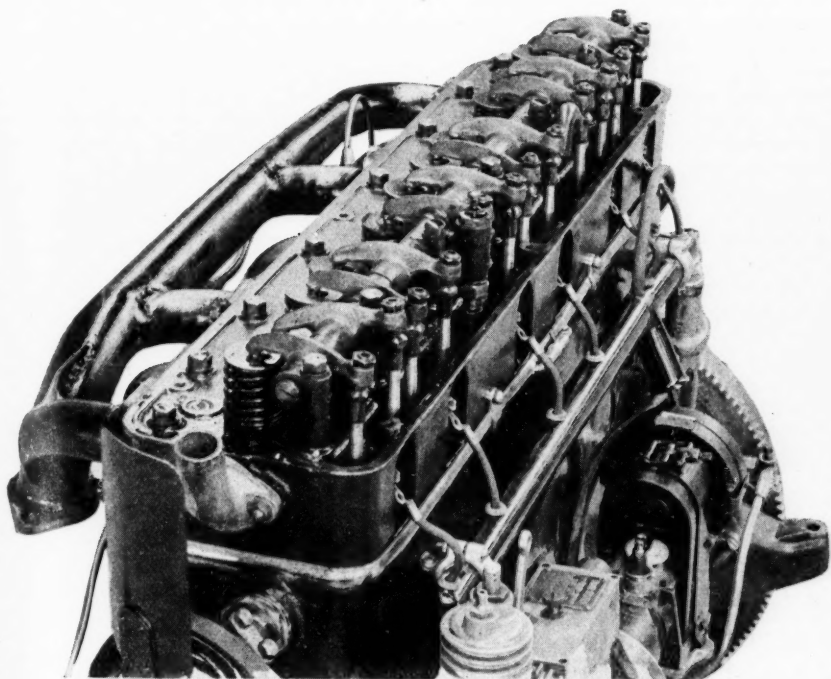
The new series Marmon 34 touring car, showing new body lines, sloping windshield and Moto-Meter

switch all lamps are off, but if the key is turned down the magneto is on and the engine can be run. In position 1 the horn, tonneau light and instrument light are on; in position 2 the dimmer and tail light are on and in position 3 the headlight and tail light are on. The switch can be locked in any position. The tonneau light referred to is a new item in Marmon equipment. It lights automatically by a door switch when the right rear door is opened, but it can be lighted by a push switch on the light itself.

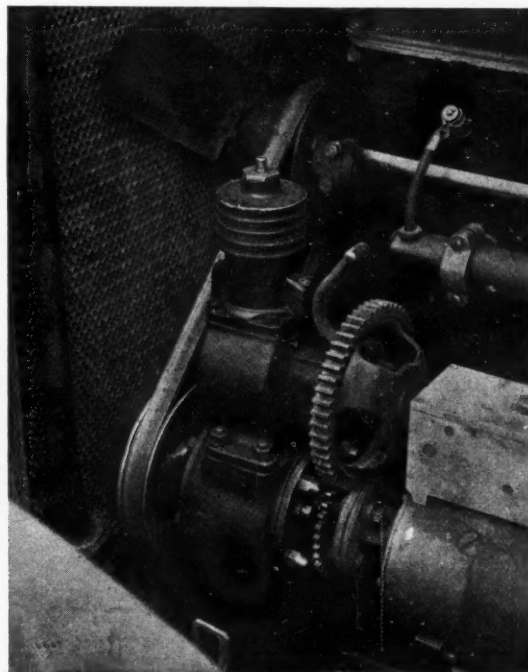
As in the previous series, the gasoline tank is carried in the cowl, but to prevent gasoline fumes getting into the driver's compartment, a magnetic type of gasoline gage has been adopted, which permits of completely sealing the tank, except for the vent, and this is carried down under the hood to a point below the body, so no fumes from it can get into the body. The speedometer trip setting is underneath instead of adjacent to the instrument. The top has a French plate glass window in the rear which is hung by belts. Hayes wire wheels will be used the coming year in-

stead of Houk wheels, the standard tire sizes being 32 by 4½ on open models and 33 by 5 on closed models.

Considerable attention has been paid by the Marmon company to closed car models of which three types are furnished, limousine, sedan and town car. In the limousine there is room for five passengers in the inclosed compartment. The auxiliary seats fold forward and out of the way when not in use. The general design of the body has been greatly improved in appearance. The town car is the same as the limousine, except that the roof does not extend over the driver's compartment. However, provision is made for protecting the driver. The sedan accommodates seven passengers within the same inclosure. It has two wide doors, one on either side and the front seat is entered through an aisle between seats. The back of the right front seat folds forward to afford freedom of movement in the car. While the sedan is of the non-convertible type the windows can be lowered so that practically all the advantages of an open car may be had when desired.

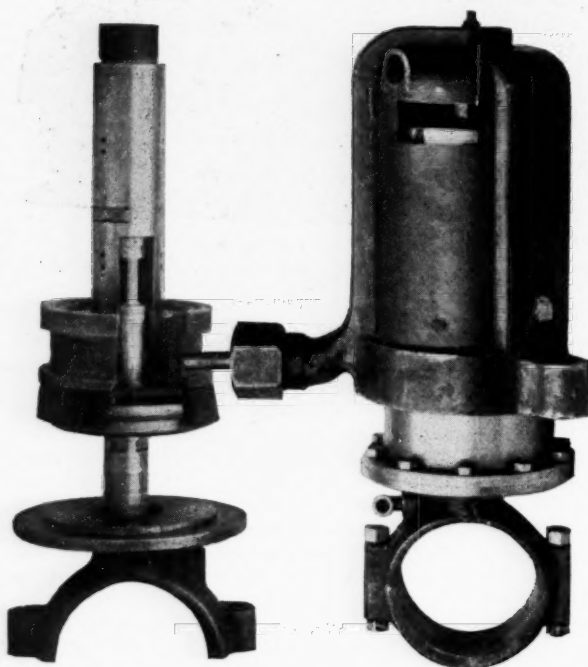


The new Marmon engine with valve cover removed, left, showing the cylinder block without side plates, and the plain bearing fan with oil reservoir

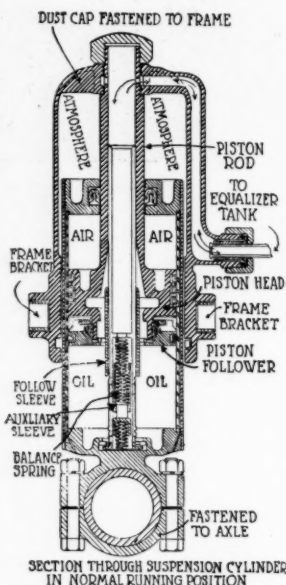


Body Suspension That Is Different

Air-O-Flex Cushions Load by Air and Oil—Each Cylinder Works Independently



Here are the component parts of the Air-O-Flex suspension and a drawing showing method of operation



SECTION THROUGH SUSPENSION CYLINDER IN NORMAL RUNNING POSITION

THE Air-O-Flex truck, made by the Air-O-Flex Corp., Detroit, incorporates a new type of body suspension in which springs are dispensed with completely and four telescoped cylinders which contract and expand on a body of air and oil are used. Each cylinder works independently and operates against the pressure of a central equalizing tank. The pressure on the cylinder in this way can be adjusted from the dash to counterbalance load and road conditions, thus giving a flexibility heretofore impossible.

A cylinder is attached at each corner of the truck frame, connecting it with the axle, and an oil lead goes to the central equalizing tank containing common cylinder oil and air under pressure. A small engine-driven pump provides the initial pressure, and a regulating valve on the dash permits the driver to set this pressure for quarter, half, full or overload and to meet the road conditions.

A ball-and-socket joint permits freedom to the individual cylinders at their point of attachment with the axle, and the upper parts are pivoted to the frame on brackets, providing full universal action and removing all side strain from the cylinders.

The driving strains are taken through the usual radius arms, and cross or side sway strains are taken through a cross radius rod on the rear axle assembly. At the front a set of flexible radius rods, resembling the main leaf of a conventional spring are used. These in no way carry any of the load, only caring for side sway and fore and aft strains, the cylinders in all cases supporting the load but being free from other influences.

In normal running position, the follow sleeve of the cylinder closes the main ports and rests on the shoulder of the piston follower. Likewise the upper ports in the main sleeve are closed by the auxiliary sleeve, and the pressure under the piston, and in the central tank is equal.

When the cylinder suddenly is displaced upward, as when striking a bump, the pressure on the oil beneath the piston is increased, discharging the oil through the lower auxiliary ports, driving the auxiliary sleeve upward against both the pressure in the equalizer tank and the balance spring until the ports of the auxiliary sleeve register with the ports in the main sleeve.

Hence, the first displacement of the oil is into the main sleeve through the lower auxiliary ports, the secondary displacement being through the lined up ports of the main sleeve and the auxiliary sleeve di-

rectly onto the equalizing tank pressure.

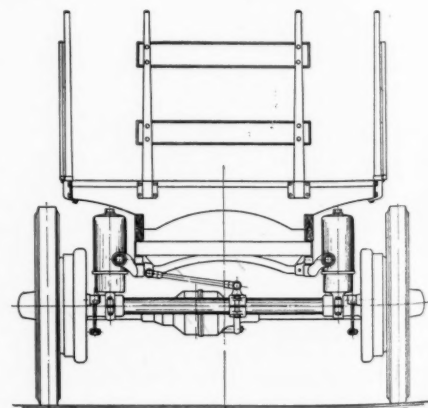
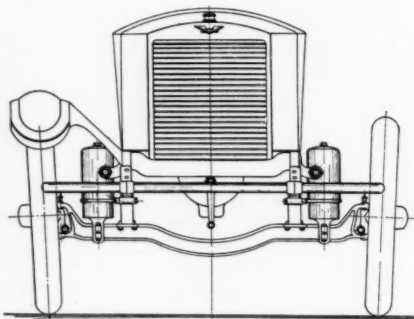
The follow sleeve has not moved during this displacement, due to a film of oil between it and main sleeve until the piston has moved downward $\frac{3}{8}$ in. At this point the shoulders on the piston move it downward, first opening one of the main ports in the main sleeve and then starting to close the auxiliary ports on the main sleeve. This action continues, the main ports opening and the auxiliary ports closing as the piston moves downward, until all of the main ports are open. They then begin to close, with continued piston travel, and when the piston is within $\frac{1}{2}$ in. of the bottom of the cylinder, all ports are closed, preventing a metal-to-metal contact.

The cushioning action is caused by three things, the squeezing of the oil out through the ports against the pressure of the equalizing tank, numberless air bubbles in the oil in the cylinder from the air pump, which act as minute cushions and provide resiliency for an otherwise incompressible liquid and the compression of the air above the piston on the down stroke and expansion on the upstroke.

When the cylinders are expanded, as when one wheel drops into a hole, all ports are closed, cutting off the connection with the equalizing tank. A vacuum, according to the amount of displacement, is created between the oil in the cylinder and the piston, and this together with the pressure built up by the air above the piston being compressed absorbs the shock and regulates the rapidity of travel downward.

The resiliency is the result of pressure and vacuum working in unison, the pressure on the oil coming from the equalizing tank. This may be regulated to operate from 40 to 100 lb. per square inch, depending on the load and nature of the road.

The specifications of the first model, a $1\frac{1}{2}$ -ton general utility truck, show standard units throughout. A Continental $3\frac{3}{4}$ by $5\frac{1}{4}$ -in. engine, Warner gearset, Borg & Beck clutch, Spicer universals, Timken front axle, Russel internal-gear rear axle, Stromberg carburetor, Bosch ignition and Duplex governor are included. The price, with cab, is \$1,700.



Plan views of front and rear suspension by use of the Air-O-Flex

The Motor Car Repair Shop

Packing Engine Joints

WHEN the engine of a motor car, whether passenger or truck, is reassembled such joints as between the cylinder head and block, water pipes, exhaust flange, crankcase, etc., must be properly made in order to be tight. Different joints demand different treatment; the joints in the water pipes, for instance, are not packed like the ones in the exhaust line.

Cylinder-head joints are now nearly all packed with copper-bound asbestos gaskets. Sometimes shellac is put on before the head is bolted down, but shellac makes it hard to remove the gasket without destroying it. Hard grease is far better for this, as it makes a tight joint and facilitates quick removal and without destruction of the gasket.

Faced joints can be set up after a little shellac has been applied to the surface. The joint between the cylinder block and crankcase is made oil-tight with a felt washer, paper gasket or hemp packing. The latter should be just heavy enough so it will flatten out when the bolts are drawn tight. When paper gaskets are used, they are made out of brown wrapping paper cut to shape with a hammer. The paper is placed on the face of the joint and the sharp edge of the latter acts as a knife when a slanting blow is struck with a hammer. Shellac is applied to one side of the paper only.

Valve caps are not so likely to stick if a little graphite is brushed on the threads. The same is true of spark plugs and cylinder head bolts. The latter must be drawn up tight to form a good joint and usually after the engine has been run a few hours they can be given a quarter turn more. Brass nuts must not be drawn up so firmly as those of steel.

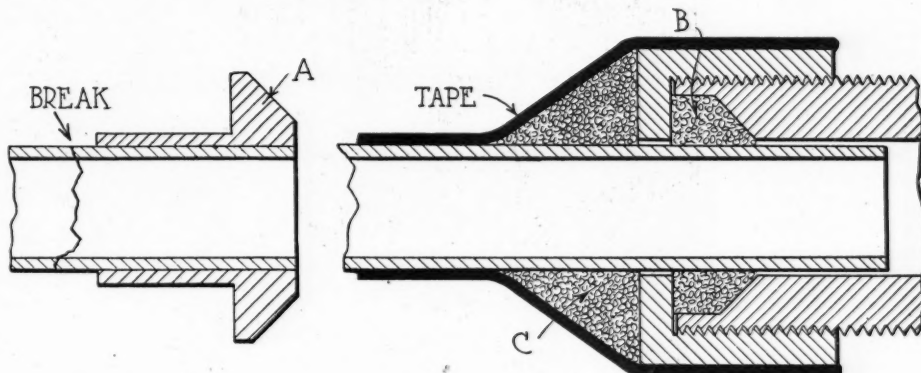
Spring Leaf Spreader

North Loup, Neb.—Editor MOTOR AGE—A little time spent in altering the points on an old clamp will more than pay for itself when it comes to oiling the springs of a car.

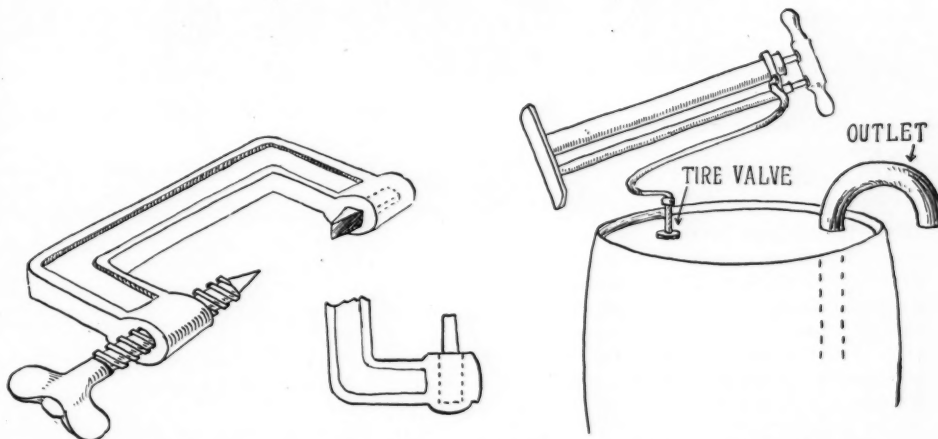
First procure a clamp which will easily slip over the edges of the spring leaves and remove the swivel from the point on the adjustable threaded spindle, and file off the ball point. Smooth it down to a true tapering point, as shown. At the other end remove the circular disk and make a rivet to fit the hole, leaving $\frac{1}{4}$ in. protruding on the inside. When in place this is filed to a wedge as shown, the edge running lengthwise with the clamp. With this device the leaves are readily forced apart and at any point, making it a simple process to oil them.—Dale R. Van Horn.

Getting Oil from Barrel

North Loup, Neb.—Editor MOTOR AGE—A novel way to get the thick oil from the small hole of the barrel it comes in is by boring a hole through the barrel head small enough to take the valve from an



How a temporary repair can be made on a gasoline line



How reader gets the thick oil from the small hole of barrel and spreads spring leaf

old bicycle tire, after the base has been removed.

The flat sides leave an opening on either side, but two small wood plugs driven in stop the leakage. Then the barrel may be pumped up to any desired pressure with an ordinary pump and oil can is removed with the barrel in any position.

Gasoline barrels may be treated in the same way by fitting a valve to the small opening in the steel tank and a larger pipe running to within an inch or so of the bottom, fitted into the other or larger hole. A good faucet on this prevents the escape of air. Gasoline can be forced up the pipe and the barrel need not be put in any other than a standing position to empty it. The fixtures are standard, and when one barrel is empty, the former can be removed and put into the next full barrel.—Dale R. Van Horn.

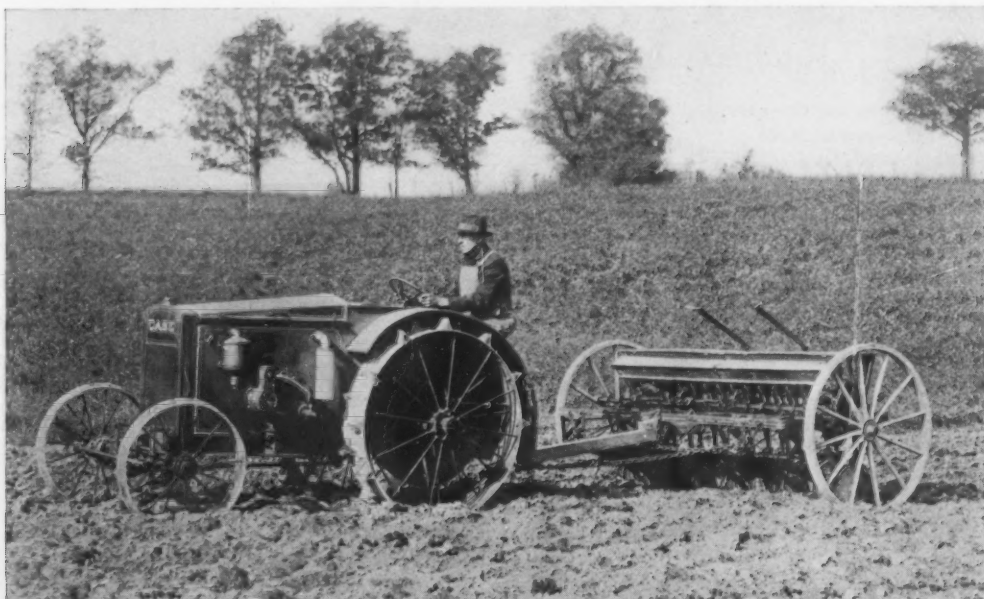
Roadside Repairs



The illustration shows how a temporary repair was made on a gasoline line which had broken close to the coupling nut on the tank. The fitting was of the kind that had a conical shaped piece, A, sweated to

the end of the pipe. The break occurred almost directly behind this piece. No available means were at hand to heat the joint in order to melt the solder so that A might be used again. A repair which lasted for many miles was carried out as follows: The end of the pipe was filed square and inserted in the fitting on the tank as far as it would go. Ordinary white string was then wrapped around the pipe at B and the nut drawn up tight. Additional string was wrapped outside of the nut at C and then the whole wrapped with friction tape. The latter was wound on the pipe for a distance of about 2 in. in order to get a good hold on it, for the real purpose of the tape was to keep the pipe from slipping out of the tank fitting.

Latest Case Tractor a Two-Plow



Case tractor demonstrating its ability in the field with a harrow

ONE of the most extensive lines of farm tractors produced by a single firm is that of the J. I. Case T. M. Co., Racine, Wis. It includes both steam and internal combustion tractors, all of the latter being operated on kerosene. The kerosene tractors are produced in five different sizes. In the present article it is proposed to deal with the "baby" of the line, the 9-18 model, which is the most recent addition and already has achieved a considerable measure of popularity. It is adapted to hauling two 14 in. bottoms and operating a 20-in. cylinder thresher without feeder or wind-stacker. The tractor complete weighs 3650 lb. and sells at \$950.

The engine is of the four-cylinder block type with valves in head. It has a bore of $3\frac{7}{8}$ in. and a stroke of 5 in.

Valve Arrangement

An interesting feature of the cylinder design is that the cooling jacket extends all the way down the cylinder walls. The valves are arranged in a line across the cylinder heads and are operated from a single camshaft through the intermediary of rock levers bearing on the cams, tappet rods and tappet levers. Valve adjustment is provided for at the upper end of the tappet rods, where the rods screw into yokes that connect with the tappet lever. The inlet manifold is cast in the cylinder head and there is only a short elbow shaped inlet pipe between the carbureter and the inlet port in the cylinder head. The whole valve mechanism is inclosed by a sheet metal cover which rests on a ledge cast on the cylinder head and is held in position by means of two nuts with scalloped rims to give a good grip. The valve chamber on top of the cylinders is in communication with the crank chamber through the vertical passage through which the tappet rods rise and sufficient oil from the spray in the crank chamber gets up into the valve chamber to insure efficient lubrication.

There are also two hand hole openings in the upper half of the case, the covers of which are provided with packing and are clamped down by means of yokes in such a manner that they can be quickly removed. When adjustment of the crankshaft bearings becomes necessary it can be made through these hand holes.

Underneath the lower part of the crankcase is a sheet metal oil sump in which the oil supply is carried. There are oil troughs under each connecting rod head and these heads are cast with dippers or splashers which, as the crank revolves, splash the oil around in the case. A plunger pump operated by means of an eccentric on the camshaft is set into the lower half of the crankcase and extends practically to the bottom of the oil sump, where its inlet is surrounded by a gauze strainer. From the pump the oil flows through an outside tube to an indicator located in direct view of the operator, and thence it passes into the engine again through a distributing pipe which has leads running to the main bearings and to the splash troughs. An oil level indicator of the float type is provided, the stem projecting from the crankcase near the cylinder wall and being provided with a ball on top. The oil filler for the crankcase extends about half way up the side of the cylinder block and is very accessible.

Fuel is carried in a cylindrical tank directly back of the engine whence it is conducted to the carbureter located on the forward side of the engine. A supply of hot air is obtained from an air heater on the exhaust manifold. There are two throttle valves in the inlet passage between the carbureter and the engine, one of these being connected to the governor and the other to the hand throttle lever. The governor is of the fly-ball type, and is entirely inclosed within the cam gear housing at the forward end of the engine. By means of a small cover plate access may be gained to the governor.

Ignition is accomplished by means of a high-tension magneto which is fitted with an impulse starter to facilitate cranking.

The whole engine is set crosswise of the frame, which has the advantage that it does away with the need for bevel gears or other transmission devices capable of transmitting power between shafts at right angles to each other. But as the radiator is set in the usual position at the front of the frame it necessitates a right-angled drive to the fan. This drive is obtained from a pair of helical gears which are completely inclosed. The fan shaft is mounted on ball bearings, and as the drive of the fan is entirely through gears, a friction clutch is provided which permits the fan to slip in case the engine is suddenly retarded or accelerated.

Clutch Construction

The clutch is of the expanding, toggle-operated type and has shoes faced with Non-burn asbestos lining. It is operated by means of a hand lever from the driver's seat. The parts by means of which the clutch is adjusted are very accessible. The same clutch serves both for transmitting power to the driving axle and for operating machinery through the belt pulley. A brake is also provided on this pulley and is operated by moving the clutch lever the opposite way. By means of this brake, driven machinery can be quickly brought to a stop and when the transmission gears are in mesh the brake can be used as a road brake for stopping the tractor on steep grades.

The 9-18 Case tractor is designed for all kinds of farm work and is provided with a belt pulley 14 in. in diameter by 5 in. face. This pulley is mounted free on an extension of the engine crankshaft to which it can be locked by means of the friction clutch. There is an outward bearing on the extension of the crankshaft, the bearing bracket for same being bolted to an extension of frame cross member. The

pulley is in a very accessible position outside the first transmission case, so the belt can be easily put on and taken off, and there is a flange on the inside of the pulley so that the belt will not come in contact with the gear housing.

A driving pinion is keyed to the hub of the belt pulley and meshes with the large gear wheel on the end of the fluted shaft of the transmission. This pinion and gear are known as the first transmission gearset and are inclosed in a housing made up of a casting and a sheet metal cover plate. The transmission proper affords two forward speeds and a reverse and is of the selective sliding pinion type, the sliding pinions being mounted on a fluted shaft. Both shafts of the transmission are mounted in Hyatt roller bearings. The secondary shaft of the transmission extends from the housing and carries the bull pinion which meshes with the bull ring on the rear axle. This latter is fitted directly over the differential gear located between the frame and the left hand driving wheel. All gears in the transmission, including the bull pinion, are made of steel, have the teeth machine cut and are hardened. The bull ring is made of semi-steel and has its teeth cast in a chill. The two speeds of the tractor are $2\frac{1}{4}$ and $3\frac{1}{2}$ m.p.h. respectively. Every part of the transmission is inclosed in a dust-proof housing and can be effectively lubricated.

The rear axle is a live axle design and—what is rather unusual—is fitted with anti-friction bearings. The live axle extends without break through the axle housing and both wheels. One of the driving wheels is keyed and pinned to the axle, while the other driving wheel is free upon the axle but has one side gear of the differential flange-bolted to it. The whole driving gear on the rear axle is inclosed in a sheet metal housing.

In order to prevent loss of traction when one driving wheel stands on slippery ground, a differential lock is provided. This consists of a bracket secured to the end of the rear axle shaft protruding from

the free wheel. This bracket has a hole drilled through it and a bolt can be inserted to engage with lugs on the wheel hub. The wheel rims are drilled for driving lugs so that different types of lugs may be used to suit the conditions of the work.

A brake drum is secured to the right hand driving wheel, being piloted on the hub, bolted to same and also connected by driving strips to the wheel rim, the same as the differential side gear on the other wheel. Owing to the provision of this surface. The drawbar is so located that it pulls directly underneath the axle bearing at a point below the rear axle, and is so constructed that it can be locked or left to swing, whichever is more desirable for the work in hand. A front axle of the motor car type is used with yoked steering heads, both the axle and the steering knuckles being steel drop forgings.

Some observations on the performance of this tractor were made for the Case company at the Fremont, Neb., demonstration by Prof. L. W. Chase, of the University of Nebraska. The tractor plowed an acre of ground 6 in. deep in 1 hr. and $16\frac{1}{2}$ min. at a fuel cost of 16 cents per acre. This demonstration was made with a three bottom 14 in. plow and served merely to show the reserve power of the tractor, which is invariably referred to as a two-plow tractor.

Pulling an 8 ft. double action disk harrow this same tractor covered an acre in $22\frac{1}{2}$ min., at a fuel cost of 9 cents, burning kerosene. Pulling 20 ft. four section spike tooth harrow the tractor harrowed an acre in the average time of $9\frac{1}{2}$ min. at a fuel cost of 7 cents per acre.

In another test the tractor pulled a 16 single disk grain drill and seeded an acre in 18 min. at a fuel cost of $5\frac{1}{2}$ cents per acre.

In addition to the tractor above described, the J. I. Case T. M. Co. makes four other sizes of the following weights and list prices, but these, it is understood, are shortly to be materially increased.

10-20 hp.....	5,050 lb.	\$1,075
12-25 hp.....	9,000 lb.	1,650
20-40 hp.....	14,050 lb.	2,450
30-60 hp.....	25,800 lb.	3,000

All tractors operate on kerosene, though they have to be started on gasoline.

TOPS FOR TOURING CARS

The Limousine Top Co., Kalamazoo, Mich., is manufacturing a complete series of limousine tops for some of the popular touring car models. These tops are designed to meet the requirements of both summer and winter, in winter being completely inclosed by glass panels. When desired side curtains are provided for summer use in case of storm when the glass or winter panels are removed. The entire top glass front and all may be removed and the regulation top replaced for summer use, if so desired.

The frame is hard wood with glued and screwed joints, the rear quarters and deck being of solid construction. The door tops are attached permanently to the doors and hinged to the side of the top panels so that both operate together easily, and the side panels are attached to the top irons of the car without marring.

A standard limousine windshield is incorporated in the top, having lower sections that swing for ventilating purposes. It is equipped with rain-vision shield and is attached to the irons regularly supporting the summer windshield. These tops are furnished in black with the interior cloth trimmed. The windows are fitted with rolled silk curtains and provided with an electric dome light. The prices are:

FOR MODEL	PRICE
Haynes, 38 and 39.....	\$300
Liberty, Touring.....	300
Franklin, Series 9.....	350
Premier, B 6.....	400
Chalmers, 35 A.....	275
Chalmers, 35 B and C.....	300

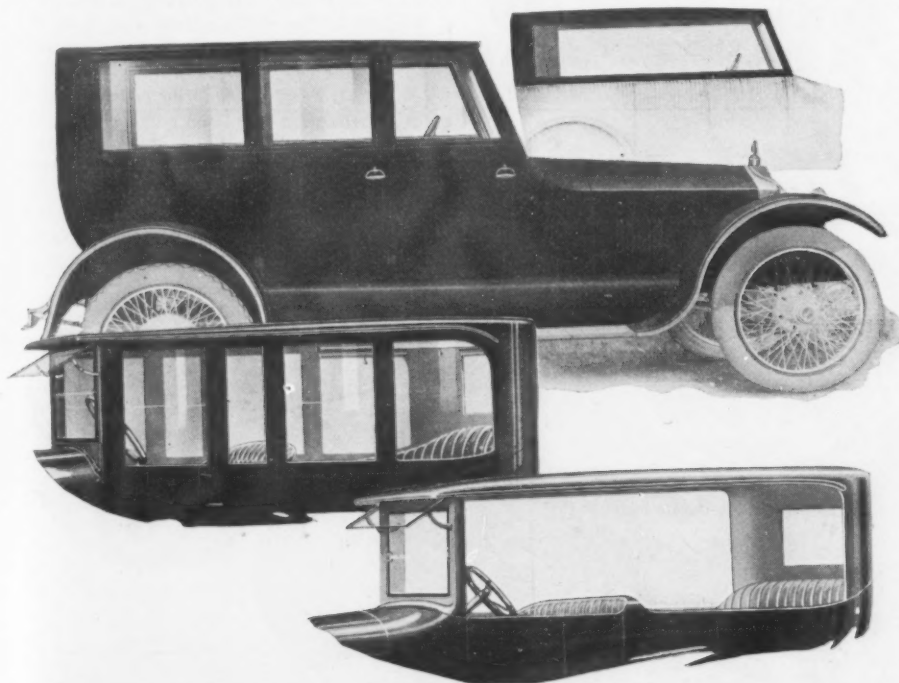
TRAINING AMBULANCE CORPS

(Concluded from page 20)

within a circle formed by other completed Ford ambulances which had their headlights tipped slightly so as to illuminate the inside of the ring.

The mess hall is unusual in that not one bit of food is wasted. Every scrap of food remaining on the plates at the mess hall is separated and then sold and converted into cash later used to buy delicacies not ordinarily provided. For instance, a special barrel is provided for the meat leavings, one for the fats, one for bones and still another for swill. As each private finishes his meal, he picks up his plate with its leavings and walks down in front of the special barrels and deposits the various bits of food into their respective places. Similarly, the knives and forks are dropped in another barrel and the cups in still another, so that the work of the dish washers may be reduced to a minimum.

The swill refuse is sold to nearby farms to be fed to pigs and similarly the fats to a rendering concern in Philadelphia which converts them into soap products. The bones are likewise sold to certain concerns for the manufacture of fertilizers.



Three types of the tops made by the Limousine Top Co. for touring car models

The Accessory Corner

Apco Anti-Rattler

THE Apco silencer, or anti-rattler, prevents rattles which arise when the bushing of the spindle arm wears, causing lost motion to make the front wheels wobble. The device consists of two heavy springs easily attached with the fingers. It comes two to a set and is finished in black enamel. Price, 40 cents a set.—Apco Mfg. Co., Providence, R. I.

Q. D. Chain Fastener

The Q. D. Fastener is a quick-detachable cross-chain device that is attached without hammering or bending the horse-shoe hooks of the cross chains. With it a new cross chain can be attached without removing the other chains from wheels. The average chain carries eighteen cross chains to a wheel, and this attachment is to be placed at each end of cross chains. Price, \$1 a dozen, \$2.50 for 3 doz., \$4.50 for 6 doz.—Cross Chain Fastener Co., Cleveland, Ohio.

Autoguard for Ford

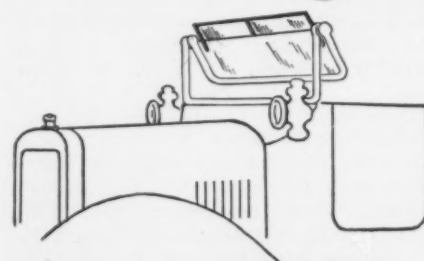
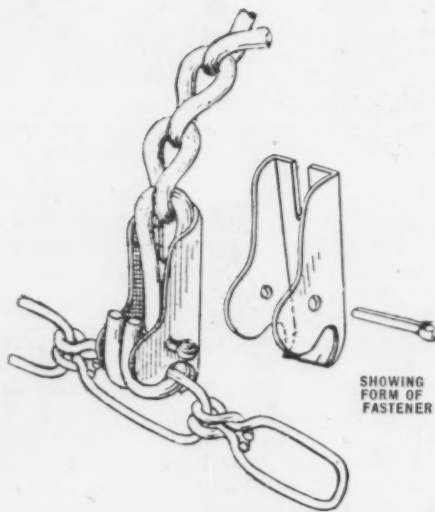
The Stewart special Ford model autoguard is furnished with brackets for installing in a few minutes. No cutting or drilling is necessary to attach. The channel bar is of high carbon steel; the spring members are of high carbon spring steel. A license plate bracket is included with this model. Shock-absorbing members consist of two full elliptic springs, which fit in the channel of the bar and extend toward the ends. The finish is bright black enamel. Stewart-Warner Speedometer Corp., Chicago.

Autoreelite

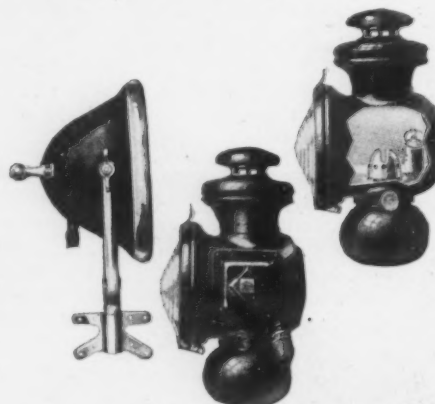
The Anderson Autoreelite is a three-in-one lamp, spotlight, trouble lamp and pleasure light, the maker claims. An adjustable cord reel is located in the ball casing just back of the lamp, and to use as a portable the knurled nut is unscrewed so the lamp can be withdrawn to the desired length. The cord reel operates like an ordinary curtain roller. The lamp and bracket are in black enamel fitted with clear or Star Lancaster lens, backed by a 21-ep. nitrogen lamp in a silvered parabolic reflector. A 3½-in. reducing mirror gives a complete view of the road behind. Three pairs of windshield clamps, round, oval and rectangular, are included with each lamp. Price, \$8 with mirror and \$7.50 without mirror.—Anderson Electric Specialty Co., 562 West Van Buren street, Chicago.

National Regulator

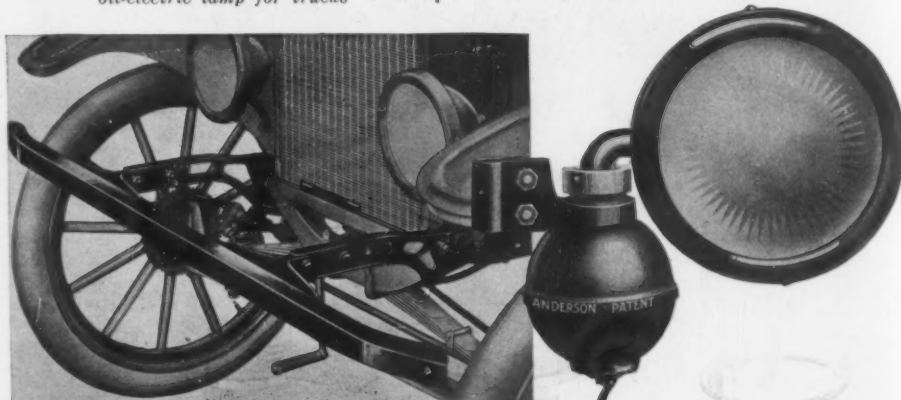
The National regulator is an auxiliary air valve screwed to the intake manifold above the carburetor and designed to make use of the gasoline vapor that gets past the pistons and into the crankcase. A tube connects the body of the regulator with a hole drilled in the left side of the crankcase, and when the engine is running on a wide open throttle, a small piston in the regulator drops, affording a clear passage for the gas from the crankcase into the manifold. Normally the piston is held by engine suction so the passage is closed. It is claimed that the device helps lubrication,



Q. D. chain fastener, above, and Stinson windshield attachment



Edmunds & Jones searchlight, left, and oil-electric lamp for trucks



Stewart autoguard for Ford cars, left, and Anderson Autoreelite

inasmuch as the oil in the crankcase will not be diluted by wasted gasoline. The regulator itself is lubricated by the oily mist drawn in with the gas vapor. To attach, it is necessary to drill a ⅛-in. hole in the manifold and tap with a ⅜ standard pipe tap. Connection is then made by tubing to the hole tapped in the crankcase or breather pipe. Price, \$7.50 complete.—National Auto Accessories Co., Pittsburgh, Pa.

Truck Lights

Electric searchlight No. 8660 is designed to meet requirements of Government service and is adaptable to the type of truck without change of construction. Finish is black and nickel. A combination oil-and-electric side and tail lamp is designed for the same service. Standard finish is all black. Prices, searchlight, \$19; oil-and-electric lamp, \$4.—Edmunds & Jones Corp., Detroit.

Windshield Ventilator

The Stinson windshield attachment is a device that may be clamped to the upper glass of the windshield of 1915, 1916 and 1917 Ford models after it has been lowered, converting it into a ventilating windshield. The extension deflects the air to the feet, eliminating the heat from the engine. The attachment also remains fastened to the upper glass when the windshield is up. Price, \$2.—E. B. Stinson, Jr., & Co., Louisville, Ky.

Hydragas

Hydragas is a compound gas said to improve the performance and increase the flexibility of any internal combustion engine using gasoline or kerosene as fuel. It consists of gasoline vapor from the carburetor and oxy-hydrogen vapor made in a generator by the addition of approximately 1 oz. of Hydragas generating fluid to each gallon of water. The gas is drawn by the suction of the engine from the generator through a small copper tube, coiled around the manifold exhaust to eliminate excess moisture and heat the vapor to the highest possible degree, and added at the manifold intake to the gasoline vapor formed in the carburetor. The more complete combustion obtained as a result of

this compound gas eliminates carbon troubles. Price, \$25 complete, including installation and 12 oz. of generating fluid, enough for from 1000 to 1500 miles.—Hydragas Sales Co., 896 Eighth avenue, New York.

Tire Pneumometer

The Pneumometer is a device to reduce wear on tires by insuring correct pressure at all times. It is an indicating device, instantly attached in place of the tire-valve dust cap, on each wheel. It is for permanent application, and through it the exact tire pressure at all times can be read. Price, \$10 a set of four—Pneumometer Co., Chicago.

Ford Horn Button

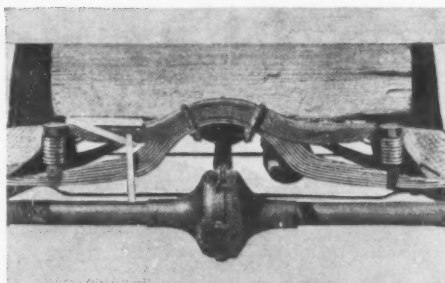
The horn button attachment which places a button for sounding the electric horn on top of the steering column, or center of the wheel, is being supplied with a neat button, whereas formerly use was made of the Ford button. The device comes complete with wires, etc. Price, 50 cents complete, 25 cents for attachment only.—Apeo Mfg. Co., Providence, R. I.

Spark Plug Attachment

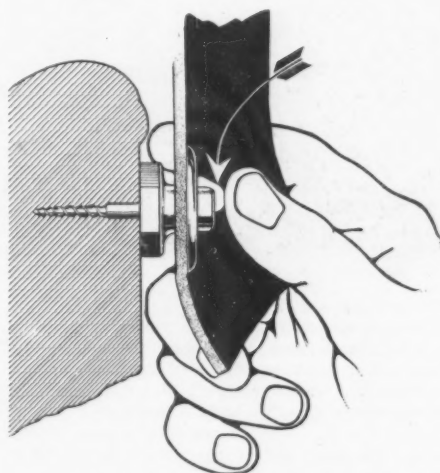
The Noyl spark plug attachment is designed to protect the spark plug from oil. The bottom is solid, and the two openings just above permit the gas to enter and be ignited but prevent the direct splashing of oil on the plug. To attach it is screwed into the cylinder in place of the plug and the plug is inserted into it. The device interferes in no way with the explosion of the mixture in the firing chamber. Various tests show it can be used in a cylinder which is badly scoured and which pumps oil, whereas without it the plug would become oil-soaked and short-circuited. Price, 50 cents.—American Automobile Accessories Co., Cincinnati, Ohio.

Ford Strengthening Devices

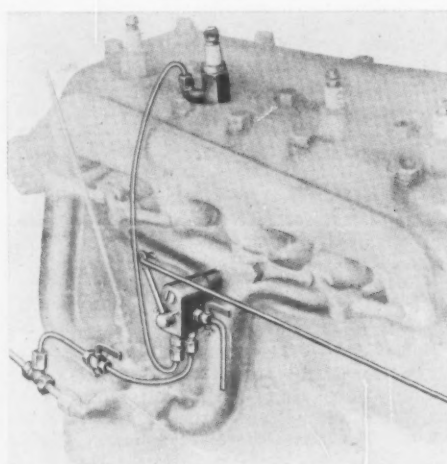
Two devices for the Ford car are made by the Ford Relief Spring & Frame Supporter Co., 7 East Forty-second street, New York. One is a spring which fastens to the channel iron and rides on the rear springs of the Ford, relieving them, to make it impossible to bump the housing and break the axle. The device is so located it does not operate unless the car is being overloaded but always acts in stopping excessive tilting, it is claimed. The other device is a truss rod which clips on to the step iron near the chassis and fas-



Spring device for strengthening Ford



How Cinch curtain fastener works



Smith Duplex primer and decarbonizer



Workrite combination, left, Pneumometer, center, and Noyl spark plug device

tens to the Ford running board truss rod to add strength and overcome sagging of the running board. Prices, springs, \$8 a pair, in two weights, up to 800 lb. for the passenger and up to 2000 lb. for the commercial car; truss rods, \$2 a set.

Windshield See-Clear

The See-Clear windshield wiper is a metal device that cleans the whole windshield by sliding across the entire length or cleans one spot by pivoting in a stationary position. No tools or drilling are necessary to install the wiper. Price, 50 cents.—Stadeker Metal Specialty Co., 19 South Fifth avenue, Chicago.

Workrite Combination

Workrite combination outfit consists of hydrometer and battery filler. The hydrometer is fitted into a glass jar of 1-qt. capacity, a rubber collar making it dust and evaporation proof. The jar is filled with distilled water, and after testing the battery the hydrometer is put back into the jar, where by squeezing the bulb the acid is rinsed out and the rubber parts cleaned. This prevents the rubber from deteriorating. The acid is mixed with the water and eventually is put back into the battery. Full instructions for testing the battery are printed on the label, which also contains practical suggestions for the care of the battery and blank spaces for the dates when last filled or tested. Price, \$1.50.—Workrite Mfg. Co., Cleveland, Ohio.

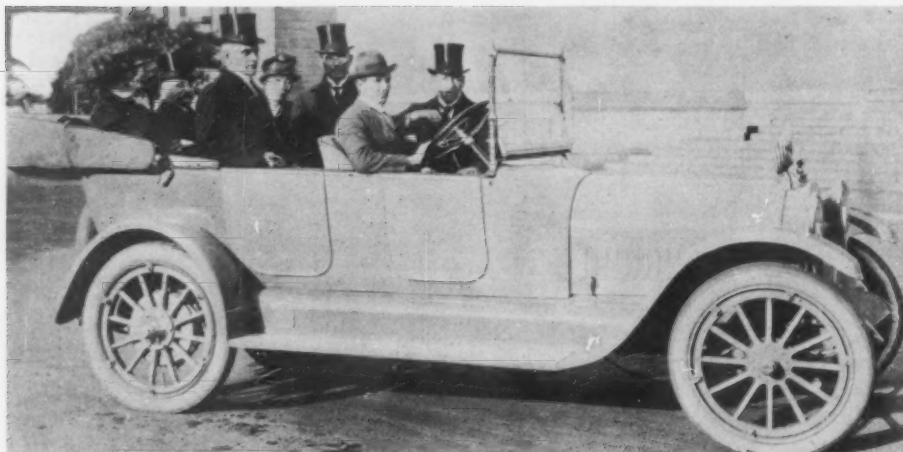
Cinch Curtain Fastener

The Cinch curtain fastener has as its chief claim that it will not tear the curtain. It is attached by an eyelet and washer, a method that does not tear or weaken the fabric. The device is made of nickel-plated brass and japan finished. Different styles are made to meet all vehicle requirements. The chief mechanical feature is the lock catch, which is simple and sturdy. Cinch fasteners attaching to frames with machine screws, wood screws or rivets have solid hexagonal heads over which are fitted hexagonal based posts, which makes it impossible for the screws or rivets to twist out in attaching. For applying the fastener four tools are used, which can be inserted in kick or power presses or operated by hand.

Smith Duplex Primer

The Smith Duplex primer and decarbonizer is made specially for the Ford car but will work equally as well on any engine when special fittings are furnished. The device utilizes the compression of the engine automatically while cranking to force into the intake manifold a spray of gasoline and air, properly mixed to form a fine mist or vapor which is highly explosive. To clean the engine it is only necessary to hold a glass of water under the tube, open the operating arm, first closing gasoline stop cock, while the engine is hot and running. The compression of the engine draws the water through the tube, the water is turned into steam and forced through the cylinders. The device is furnished complete with special spark plug and all connections, ready for installation. The sole distributor is Irving M. Shaw, 80 Fifth avenue, New York.

Among the Makers and Dealers



IN HONOR OF THE UNITED STATES ENTRY—This shows a party of celebrities in a Studebaker on their way to the American consulate, Australia, to do honor to our entry into the war. In the left front seat, next to the driver, is the Belgian consul, Maurice Watteuw; in the left auxiliary armchair, the Japanese consul, S. Shimizu; in the right auxiliary armchair, the American consul, J. I. Brittain; in the left rear seat, Mrs. Shimizu, by A. Chayet, the French consul, and Mrs. J. I. Brittain

SCOTT Back with U. S. Truck—Thomas Scott has rejoined the inspection department of the United States Motor Truck Co., Cincinnati, Ohio.

Perlman Rim Promotes Sanford—Glenn A. Sanford has been made sales engineer of the Perlman Rim Corp., having been promoted from purchasing agent. Charles C. Lewis will succeed Mr. Sanford.

Baker with United Motors Service—R. M. Baker has been appointed sales manager of the United Motors Service, Inc., Detroit. He was formerly sales representative of the Standard Steel Spring Co., Carapopolis, Pa.

White to Build Philadelphia Station—The White Co. will erect a \$175,000 service station in Philadelphia, Pa. The building will cover a plot 215 by 270 ft. and will include offices, stock room, lockers and space for storing trucks. The plans include a blacksmith shop and boiler room.

Titan to Make Trucks Only—The Titan Truck & Tractor Co., of Milwaukee, Wis., which was organized recently with a capital stock of \$100,000, has changed its name to Titan Truck Co. The original intention was to manufacture a line of tractors in addition to trucks, but for the present, at least, the entire capacity will be required to produce trucks exclusively.

Traverse City Car Produces—The Traverse City Motor Car Co., Traverse City, Mich., has completed to date six cars, which have been sold and delivered. Eighteen other cars are under construction, and, according to reports, a contract is pending calling for ten cars per day. However, the company is not in a position to guarantee delivery on this amount.

Taylor to Continue Production—The Taylor Motor Truck Co., Fremont, Ohio, may continue to manufacture trucks in the old Burford plant, according to an order by Federal Judge Killits to W. W. Morrison, president of the Continental Trust & Savings Bank, Toledo, trustee of the bankrupt Burford company. The court commands the trustee to turn the property over to the Taylor Motor Truck Co. as soon as an inventory is completed. Mr. Morrison is ordered to

place all operations in the factory under observation and all business transacted by the company must be accounted for.

Brush Joins Canadian Elgin—George L. Brush, Canadian manager for the Harroun Motor Corp., has resigned to join the Elgin Motor Car Corp. of Canada.

Norfolk Tire Fabric to Build—The Norfolk Tire Fabric Co. will build a plant at Norfolk, Va., costing \$1,040,000. The building is to be 625 by 264 ft. and will cost \$300,000. The machinery will cost \$740,000. The weekly capacity will be 50,000 lb. of core fabric.

Studebaker Takes Over Toledo Dealer—The Studebaker Corp. has taken over the lease and business of the Studebaker Sales Co., Toledo, Ohio. Practically the same organization will remain in charge except that the agency is now a direct branch. Charles E. Doan is manager and George Vogelsang is assistant manager.

Voss to Go to Capital—Walter C. Voss, formerly in charge of the Detroit office of the rim and tube division of the Standard Parts Co., is to be transferred to Washington, D. C., to look after the business there for the company. He will be succeeded by Art A. Loeffler, formerly of the Jackson-Church-Wilcox Co., Saginaw, Mich.

McQuay-Norris Gives Thirty-five Recruits—The McQuay-Norris Mfg. Co., St. Louis, Mo., has raised a service flag that shows twenty-five of the house staff have enlisted. Nine of the enlistments were from the factory, two from the office and thirteen from the field force. Nearly all the enlistments are in the engineering or aviation corps, as most of the men are expert mechanics.

Superior Tire to Start New Plant—The Superior Tire Co., Anderson, Ind., will within the next thirty days start breaking ground for the erection of a new factory. The company, which is capitalized at \$750,000, will erect a two-story concrete structure with a floor space of 50,000 sq. ft. The plant will have a capacity of 500 tires daily, but only 300 tires will be manufactured daily at the start. The officers are: President, O. Hibner, former sales manager of the Knight Tire & Rubber Co.; consulting engineer, Charles

A. BeSaw, president BeSaw Tire & Rubber Co.; vice-president, W. I. O'Bryan; secretary, W. W. Campbell.

Hayes Purchases Machinery—The Hayes Mfg. Co. has purchased for \$25,000 on conditional sale the machinery of the Toledo Machine & Tool Co.

Aluminum Goods Takes Sixth of Quota—The Aluminum Goods Mfg. Co., Manitowoc, Wis., purchased a sixth of Manitowoc County's allotment under the quota for the second Liberty Loan by subscribing for \$150,000 worth.

St. Louis Truck Dealers Elect—The organization of the St. Louis Truck Manufacturers' and Dealers' Association has been completed by the election of Charles A. Merien, One-Wheel Truck Co., president; Wastell Gray, International Mack Corp., secretary; N. F. Sutton, General Motors Truck Co., treasurer. The organization grew out of Open House week.

Pilling Becomes Hupp District Manager—Frank W. Pilling has been made district manager of the Hupp Motor Car Co. for the Detroit and Mid West territory. Mr. Pilling has been selling cars for fourteen years, having been assistant sales manager for the K-R-I-T Motor Car Co. and was most recently district supervisor for the Liberty Motor Car Co. in the East.

Perfection Tire to Triple Capacity—The Perfection Tire & Rubber Co. has started construction work on the second unit of its factory at Fort Madison, Iowa. The new unit will be 60 by 250 ft., three stories and of steel and concrete. All material is now on the ground and it is hoped to have the building under cover by Dec. 15. The new building will triple the facilities of the Perfection Tire & Rubber Co.

Youngstown Pressed Steel Organizes—The Youngstown Pressed Steel Co. has been organized with a capital of \$1,000,000 and has purchased the fabricating department of the Sharon Steel Hoop Co. and its subsidiary, the Youngstown Iron & Steel Co. For the present these departments will be operated in their present quarters, but later a new plant will be built with increased capacity. W. W. Galbreath heads the new company and G. F. Danielson is associated with him.

Lewis Foundry Recapitalizes—The Lewis Foundry Co. has been reincorporated as the Lewis Steel Products Co. and has increased its capital to \$100,000. This company manufactures from 10,000 to 15,000 valves a day and employs nearly 200 men in the factory and machine shop. These vary from the type used in the motorcycle engine to those used in motor cars, airplanes and tractors. Two new buildings have been added, but these are not sufficient to handle the increased business.

Service Men Hear Lectures—Motor car service men of Chicago are to be given a series of lectures by the Service Managers' Association of the Chicago Automobile Trade Association. The first of these was given at a dinner by Elwood Haynes. A hundred of the service men of motor row were present. Mr. Haynes' subject was "Origin of Gas and Gasoline Engines." The series comprises sixteen lectures to be given this winter, some of which are: "Types of Gasoline Motors," Prof. Daniel Roesch of the Armour Institute of Technology; "Construction and Operation of Gasoline Motors," by a Buda Co. engineer; "Hydrocarbon Fuels and Carburetion," by an engineer of Findelsen

& Kropf Mfg. Co.; "Ignition and Timing of Hydrocarbon Engines," by an engineer of the Remy Electric Co.

Crawford with Holley Brothers—C. S. Crawford has become director of purchases for the Holley Brothers Co. Mr. Crawford was formerly with the Kelsey Wheel Co.

Hartzell Manages Federal District—John H. Hartzell has been made district sales manager for the Federal Motor Truck Co., having the territory south of the Ohio river.

Sampsell Is Assistant Sales Manager—P. D. Sampsell has been made assistant sales manager of the United States Motor Truck Co. in charge of the Ohio, Indiana and West Virginia territory.

Cullen Resigns from Chalmers—George R. Cullen has resigned as editor of the Chalmers Monogram and the Chalmers Illustrated News. Mr. Cullen was formerly publicity manager of the Hudson Motor Car Co. and editor of the Hudson Triangle.

U. S. L. Holds Service Conference—Papers covering every angle of battery service station business were read and discussed at the annual conference of the service station representatives of the U. S. Light & Heat Corp. at Niagara Falls recently. The annual service dinner was held.

Jorgenson to Add to Line—The Jorgenson Mfg. Co., Waupaca, Wis., is preparing to manufacture and market accessories and specialties in addition to its standard line of engine primers, orders for more than 20,000 of which are being filled. The company has developed a carburetor which utilizes the heavier grades of fuel, and this is being manufactured on a commercial basis.

Snow Transferred to South—Clifford M. Snow has succeeded Hal M. Harris as southwestern division sales manager for the Selden Truck Sales Co., Rochester, N. Y. Division headquarters have been moved from Atlanta, Ga., to Birmingham, Ala. Mr. Snow for the last two years has been with the Selden organization in the New York territory, but is familiar with southern conditions, as he covered that territory before then.

U. S. Tire Men Meet—The United States Tire Co. held a four-day convention of its salesmen from all parts of the country recently. About 525 representatives were present, studying the present trade situation and methods of bettering their selling campaigns. J. N. Gunn, president, and J. C. Weston, director of sales, were the principal speakers. The publicity representative of the company issued a daily convention newspaper styled Our Horn.

Los Angeles Dealers Building—Building operations on the Los Angeles row continue active. Hudson, Peerless, Paige, Marmon and Stutz are either housed in new show places or about to be, while the Leach Motor Car Co., which handles King, Liberty, Dort and Premier, has broken ground for a quarter-million home. More than a million is to be spent on new salesrooms before spring. While Los Angeles dealers do not consider business up to normal in Southern California, they expect new business this year, especially from Arizona and Mexico.

Leavitt to Distribute Oldsmobile—J. W. Leavitt & Co., San Francisco, Cal., one of the oldest dealers in the country and a pioneer in the development of the motor car trade on the Pacific coast, has taken over the distribution of the Oldsmobile for California and Nevada. It was formed in 1894 to handle bicycles. In 1901 Leavitt contracted for fifty motor cars, which was looked upon as a gigantic undertaking in those days. From this small contract the business was expanded until in one year 9000 cars were sold. Leavitt then sold his agency to the Willys-Overland Co., but maintained his organiza-

tion intact. He contracted to handle the Chevrolet, and to this has been added the Oldsmobile.

Sumner with U. S. Truck—Philip W. Sumner has been placed in charge of the sales production department of the United States Motor Truck Co. He was formerly with the Stewart Iron Works.

Wagner Axle Buys Plant—The Wagner Axle Co. has purchased the plant of the De Tangle Motors Co., Anderson, Ind., and will manufacture a worm-drive axle. Work is to start as soon as possible on a large contract.

Tower Is Hessian Chief Engineer—E. V. Tower has become chief engineer of the Hessian Tiller & Tractor Corp. Mr. Tower formerly was head of the experimental department of the Maxwell Motor Co. and has been connected with the production of the Harroun Motors Corp.

Steel Products Company Changes Name—The Page Woven Wire Fence Co., Pittsburgh, Pa., has changed its corporate name to the Page Steel & Wire Co. and is opening an office with E. C. Sattley as general manager. The company has developed special analysis high carbon steel products for manufacturing purposes. The general sales houses are at Monessen, Pa., and Adrian, Mich.

Boone Tire Installing Machinery—The Boone Tire & Rubber Co., Sycamore, Ill., has started to install the equipment and machinery in its new \$100,000 plant at Chippewa Falls, Wis., and hopes to be able to start actual manufacturing by Nov. 15. Considerable delay has been encountered in completing the factory because of the shortage of materials and labor. A feature of the equipment is the big heater press, which ex-

tends down 29 ft. from the floor of the main shop. It was necessary to blast through 16 ft. of solid rock to provide a foundation.

Marshall Now at Toledo—L. F. Marshall has become manager of the Toledo, Ohio, branch of the Fisk Rubber Co. He was formerly manager of the Cleveland branch.

Hull Now With Commerce—W. C. Hull has become district manager in the southwestern field for the Commerce Motor Car Co. He was formerly with the Ross Motor Car Co.

Carpenter Is Now with U. S. Truck—F. E. Carpenter has been appointed assistant sales manager of the United States Motor Truck Co. He was formerly sales manager of the Stewart Iron Works.

Bearings Co. Opens New York Office—The Bearings Co. of Pennsylvania, maker of bearings and the Gill piston ring, has opened a branch office in New York. A complete stock of bearings is maintained. A sales agency also has been installed at Newark, N. J.

Standard One-Piece Piston Ring—The Standard Piston Ring Co. is making preparations to manufacture a one-piece compression-proof ring. Contracts have been secured calling for practically the complete output and it is possible that the company may incorporate later.

Griefen Heads Anderson Electric Branch—Richard S. Griefen has been appointed manager of the Milwaukee, Wis., branch of the Anderson Electric Car Co., Detroit, to succeed A. E. Jenny, resigned. The headquarters of the Milwaukee branch are at 532-534 Jefferson street.

LaCrosse Tractor to Increase Output—The LaCrosse Tractor Co., LaCrosse, Wis., will purchase new machinery and equipment costing about \$75,000. The new machinery will enable the company to increase its output from 75 to 100 per cent. An addition to the plant will be erected early in 1918.

Harrow Tractor to Build Plant—The A. T. Harrow Tractor Co. will build a plant at St. Clair, Mich., and produce tractors. The first units of the new plant will be used for assembly purposes to speed production. The plant will be enlarged by degrees, and later the Harrow company will make its own parts.

Reynolds Becomes Goodrich Manager—William A. Reynolds has been appointed district manager for the Goodyear Tire & Rubber Co. in New York, succeeding A. A. Lyon, who is now special representative. Mr. Reynolds was formerly in the industrial development department.

Federal Rubber Holds Conference—Sixty-five Federal Rubber managers and representatives met at the factory at Cudahy, Wis., in a four-day national sales conference. The session was voted the most successful of its kind ever arranged by Federal. In addition to round table conferences, an elaborate entertainment program was provided.

Comet Lets Factory Contracts—The contract for the construction of the Comet Automobile Co. factory at Decatur, Ill., has been let and amounts to approximately \$100,000. The contracts call for completion of the first unit by March 1. It is planned to employ 600 men at the outset and increase this number as conditions warrant.

Triangle Truck to Rush Building—Work has been resumed on the plant of the Triangle Truck Co., St. Johns, Mich., and will be rushed to completion. Difficulty in obtaining the roofing material has been responsible for the long delay and it is expected that it will be installed in about two weeks. Practically all the material for the first truck is on hand and the parts will be assembled as soon as it is possible to work in the new plant.



TUBE LIFTS CAR—This shows a test of a Pennsylvania tube, which is lifting a five-passenger car on a specially built scaffold by windlass and tackle. The tube is bearing a total weight of 2990 lb.

From the Four Winds



WHERE SIGN POSTS ARE LUXURIES—Out on the lonesome expanses of the upper Colorado desert in California a sign post is considered a luxury. The little town of Banning, however, believes in signs. There is but one road out of Banning to those sun-parched sandy wastes, and just as the motorist leaves the city limits for the mesquite, cat-claw, Juniper trees and heat, Banning, with municipal kindness, wishes him God's speed and cordially invites him to return.

GOOD Roads Club Organizes—The Chipewa Country Automobile Club was organized at Sault Ste. Marie, Mich., to promote good roads. Fred S. Case is president and C. E. Chipley, secretary.

Des Moines Postpones Show—The first annual closed car show of the Des Moines Automobile Dealers' Association, scheduled for the week of Oct. 22, has been postponed one week. Activity on the part of the dealers in the Liberty Loan campaign and inability to get cars are the causes.

Liberty Road Opens to Motorists—Tourists passing through Baltimore on their way to western Maryland to visit Hagerstown, Cumberland and Pittsburgh will be able to have a good road all the way since the opening of the Liberty road from Harrisonville to the Old Court road. Many picturesque spots are located along this route.

Much New Alabama Highway Mileage—Ninety-nine miles of improved highway were built by state aid in Alabama during the last fiscal year of the state highway department. This represents an expenditure of \$276,158.52 by the state and counties. In addition to this, the counties constructed 1,450.5 miles of roads and did much bridge work at a total cost of \$3,447,131.18. When the fiscal year ended this state had 9,536.8 miles of improved roads, compared with 3,780 when the highway department was created in 1911.

Complete Burlington Way Organization—The organization of the Burlington Way trail to the Gulf of Mexico has been completed, following a tour of officers of the Illinois divisions. The party was entertained at numerous points en route by civic associations. At Jackson, Tenn., the tourists attended the first annual convention of the Shiloh National Park division of the Burlington Way. After reaching Corinth, Miss., rivalry between two proposed routings of the Orange and White trail was so keen that instead of giving the grant either to New Orleans or Gulfport, the committee satisfied both by agreeing to divide the trail at Hattiesburg, Miss., one branch to enter New Orleans and the other Gulfport. Cliff Williams of Merid-

ian, Miss., was elected supervisor of the new division. Vice-presidents were appointed for each city through which the trail passes on its way to the Gulf.

Arizona Licenses 19,391 Cars—In Arizona 19,391 motor cars have been licensed this year, together with 865 motorcycles and 242 dealers. Fees to date amount to \$118,500 and will total \$120,000 for the year, as compared with total receipts of \$67,214.50 for 1916. The registration of motor cars last

Coming Motor Events

MEETINGS

Jan. 11-16—New York, National Association of Automobile Accessory Jobbers, convention.

SHOWS

Nov. 12-18—Denver, Col.
Nov. 12-19—Los Angeles, Cal.
Nov. 12-19—El Paso, Tex.
Dec. 3-8—Akron, Ohio.
Jan. 5-12—New York.
Jan. 9-27—Cleveland, Ohio.
Jan. 11-18—Washington, D. C.
Jan. 11-19—Providence, R. I.
Jan. 11-19—Philadelphia, Pa.
Jan. 18-24—Milwaukee, Wis.
Jan. 19-26—Montreal, Canada.
Jan. 19-27—Cleveland, Ohio.
Jan. 21-26—Scranton, Pa.
Jan. 21-26—York, Pa.
Jan. 21-26—Portland, Ore.
Jan. 22-26—Baltimore, Md.
Jan. 26-Feb. 2—Chicago.
Feb. 2-9—Minneapolis, Minn.
Feb. 9-16—Kansas City, Mo.
Feb. 11-16—Kansas City, Mo.
Feb. 11-16—St. Louis, Mo.
Feb. 11-17—Toledo, Ohio.
Feb. 18-23—Syracuse, N. Y.
Feb. 18-23—Grand Rapids, Mich.
Feb. 18-23—Springfield, Ohio.
Feb. 18-23—Des Moines, Iowa.
Feb. 18-25—Pittsfield, Mass.
Feb. 18-27—South Bethlehem, Pa.
Feb. 26-March 3—Omaha, Neb.
March 2-9—Boston, Mass.
March 20-23—Trenton, N. J.
April 9-13—Stockton, Cal.

year was 12,125. Of the total of more than 19,000 cars registered this year, more than 5500 are in Phoenix and Maricopa county.

Road Mileage in Quebec Province—The Province of Ontario has approximately 55,000 miles of roads. More than 43,000 miles have been treated and are in fairly good condition. About 20,000 miles are well graded earth roads; about 3000 miles are surfaced with broken stone and about 19,000 are surfaced with gravel.

Washington Motorists Go to Farms—Many families in Pierce County, Washington, are beginning to make a practice of going direct to the farm for fresh vegetables, eggs and poultry. Some small truck farmers have sold practically all their vegetables at the farm gate this season. They receive orders over the telephone and are ready to deliver when the car calls.

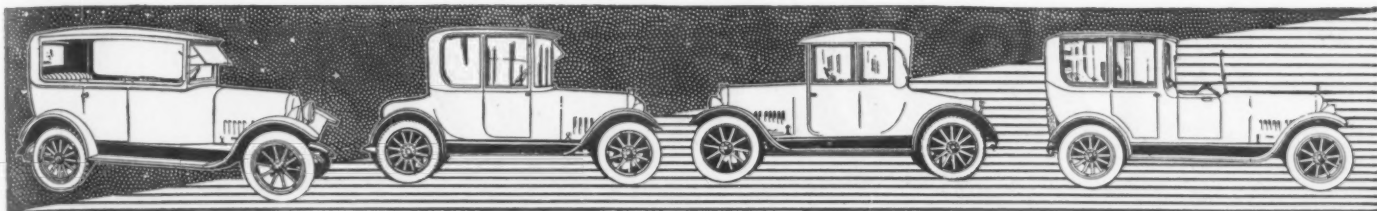
Detroit Looks for Show Building—The Detroit Automobile Dealers' Association is having difficulty in finding a building in which to stage its show. Last year the Billy Sunday tabernacle was used, but this has been torn down. A building containing at least 75,000 to 100,000 sq. ft. of floor space is necessary and there seems to be nothing that will meet the requirements.

County Votes Road Money—Charleston's chamber of commerce recently held an election in which \$275,000 in bonds was voted for permanent highways in the county. The election was held without cost to the county, as 150 road boosters served as election managers and clerks without cost and the chamber furnished free polling places and advertised the election. The bond issue passed by a vote of 7 to 1.

Seven Trips a Day with Truck—Walter Faber, a farmer 9 miles south of Wayne, Neb., has hauled 10,000 bu. of shelled corn and the rest of his corn, as well as all his wheat, oats, hay and potatoes, to market in one 1-ton Maxwell truck. He repeatedly has hauled 55 bu. to a load, driven 9 miles into town and made seven trips a day. He figures this as just five more trips than he could have made with a team of first-class horses.

Capital in Safety-First Campaign—A safety-first campaign, aimed at the prevention of street accidents, principally those resulting from the operation of motor vehicles, is being conducted by the chief of police at Washington, D. C., aided by the safety-first organization. Leaders of the movement are seeking to make pedestrians realize the necessity for the exercise of care in crossing streets as well as impressing upon the drivers of motor cars the importance of the observance of traffic regulations. The crusade against reckless driving resulted in the collection of \$600 in fines in one day.

Lo! the Poor Arizona Speeder—Aroused by an epidemic of fatal accidents caused by speeding, which culminated in four fatalities in three days, the board of supervisors of Maricopa county, in which Phoenix is located, have suggested to all justices of the peace that a \$50 fine be imposed for speeding hereafter, instead of the usual \$5 and costs. The supervisors also advise that the \$50 penalty be doubled for a second offense. Every justice court in the county hereafter will be provided each month with a list of arrests and convictions in every other court. The penalty for speeding will be at the discretion of the court, but it is understood that the justices have expressed themselves in favor of the suggested higher fines.



Velie New Models Make a Big Hit

New Biltwel Features

Six-cylinder Velie-Continental Motor—40 horse-power
 Timken Axles front and rear
 Helical Gears in Motor—no chains
 Enclosed Multiple Dry Disc Clutch
 Hotchkiss Drive—no noisy torque arm
 Spiral Gears in Floating Rear Axle
 Remy Automatic Ignition—Push Button Starter
 Double Bulb Headlights—Dashlight
 All Wires Enclosed in Metal Conduits
 Rear Gasoline Tank—Vacuum Feed
 Simple Rocking Gear Shift Lever
 Luxurious Straight Line Body
 Unusually Wide Doors—easy to enter
 High Grade Leather Upholstery
 French Plaited Cushions Over Real Curled Hair
 Long, Flexible Underslung Springs
 Expanding Tire Holder—no Straps
 Mirror Body Finish—20 Operations Deep
 Light of Weight—Economical of Fuel
 Nine Body Styles, Open and Enclosed

THE announcement of nine new Velie models caused a sensation—their splendid design, mirror finish and superb upholstery have won the hearts of car buyers everywhere. The addition of a new and stunning Sport model rounds out the Biltwel line completely, making a style for every prospect—and gives the dealer unsurpassed advantages in meeting his market.

The national advertising campaign just closed, and the immediate preparations for a better one the coming season make the

Velie One of the Most Widely Advertised Cars

in America. The prestige brought by Velie's wonderful success has attracted thousands of dealers to the Velie standard. The growing demand for Velie cars has tripled production. A low-cost car of high-priced features is a direct result of this huge volume.

The Velie Dealer Proposition is one of golden opportunity, it wins in service and in trade building possibilities. The prices are right—the car is right. Touring Car \$1265. If your territory is open investigate at once.

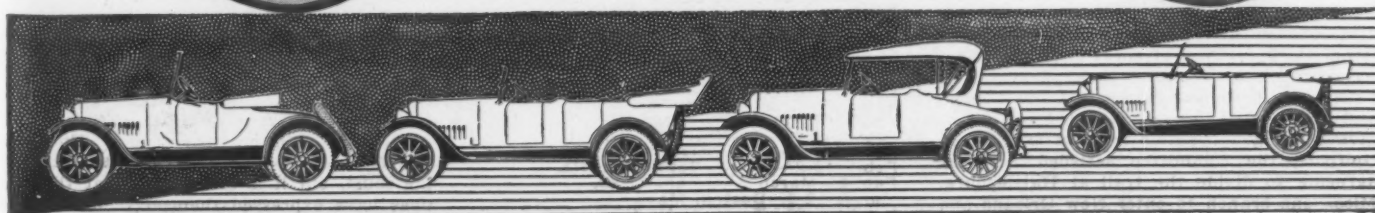
Velie Motors Corporation

Builders of Automobiles,
 Motor Trucks and Tractors

113 Velie Place Moline, Illinois

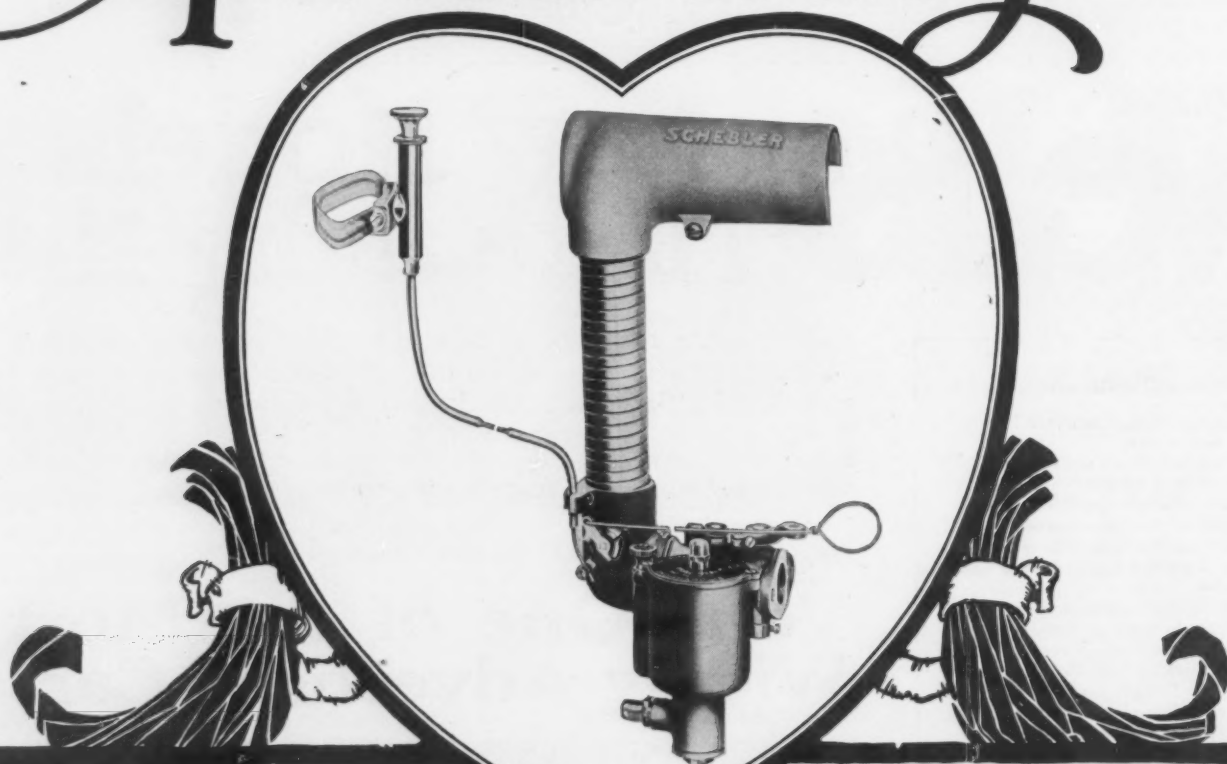


Sport Model, \$1850
 Wire Wheels Extra



When Writing to Advertisers, Please Mention Motor Age

Announcing



SCHEBLER VALVELESS CARBURETOR *for* FORD CARS

NO MOVING PARTS BUT THE THROTTLE
—BUILT ON SCIENTIFIC PRINCIPLES—
DEVELOPS THE MAXIMUM POWER OF THE
MOTOR—USES MINIMUM FUEL—WE DO NOT
CLAIM THIS CARBURETOR "IS AS GOOD."
WE GUARANTEE ITS SUPERIORITY TO ANY
OTHER CARBURETOR MANUFACTURED.

Write for prices and full particulars.

WHEELER-SCHEBLER CARBURETOR CO., Inc.
INDIANAPOLIS, U. S. A.



Just Say "Multi-Powered" and He Is Interested

That's the psychological sales-clinching phrase. It immediately diverts attention to the famous Crow-Elkhart Multi-Powered car. Multi-power is an engineering victory that brings to the economical four-cylinder motor, the power of the multiple-cylinder engine.

"Multi Power" are the magic words that spell success for dealers, and you can back up this Multi-Powered feature with other important sales features that put the prospect's name on the dotted line.

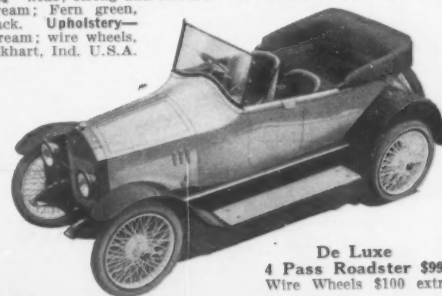
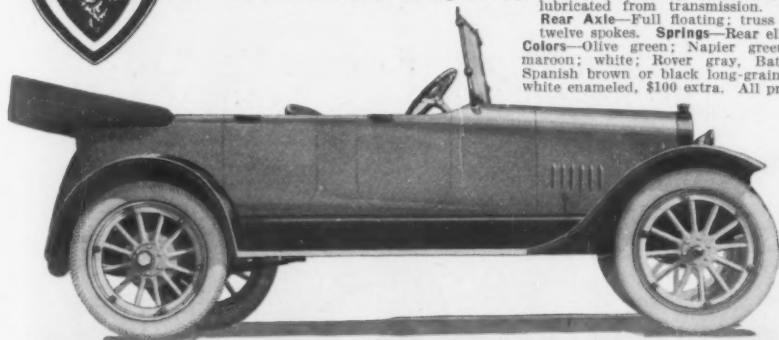
Your Territory Clamors for Multi-Power

If Crow-Elkhart Multi-Powered car is not represented in your territory, you are missing one of the great big opportunities that are offered in Motordom. Just say "Multi-Power" and he is interested—show him Multi-Power and he is sold. Write or wire today for our 1918 dealer plan and proposition. Your territory may be open and you may not know it, so investigate at once.

CROW-ELKHART MOTOR COMPANY Dept. 73 ELKHART, INDIANA



BRIEF SPECIFICATIONS: Motor—Multi-powered; bore 3½" and stroke 5"; large valves; bearings extra long; removable cylinder head; 3-point suspension. Lubrication—Splash constant level system with oil pump. Cooling—Thermo-siphon with large water jacket; large honey-comb radiator insuring perfect cooling. Carburetor—Zenith float-feed double-jet type; gasoline supplied through Stewart vacuum feed from 12-gallon tank carried in rear. Electrical Equipment—Dyneto 2-unit system; Bendix drive on starting motor; generator driven through silent head gears. Connecticut ignition. Clutch—Borg & Beck multiple disc; bearing self lubricated from transmission. Wheelbase—114½ inches. Weight—Approximate shipping weight, 2295 pounds. Rear Axle—Full floating; truss rod. Front axle, drop-forged. Wheels—Artillery type fitted with 32"x3½" tire; twelve spokes. Springs—Rear elliptic type 44" long; 1½" wide; strong and resilient. Front, semi-elliptic 34" long. Colors—Olive green; Napier green; Richeleau blue; cream; Fern green, maroon; white; Rover gray, Battleship gray, and black. Upholstery—Spanish brown or black long-grain. All wood wheels, cream; wire wheels, white enameled, \$100 extra. All prices f. o. b. factory, Elkhart, Ind. U.S.A.



De Luxe
4 Pass Roadster \$995
Wire Wheels \$100 extra

Crow-Elkhart Multi-Powered Car \$935

Is your carburetor competent?

Or is yours a slacker? Does it frequently fail you at a time when you particularly need abundant power, quick acceleration or extra-measure speed?

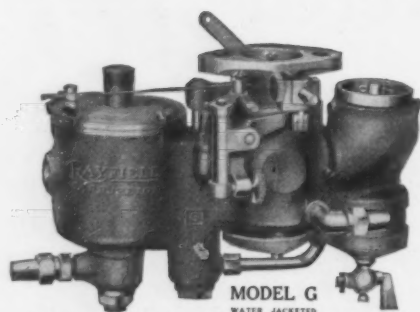
Faulty carburetion can do more to mar the joy of driving than the failure of almost any other unit in the mechanism of your car.

If you've always been a Rayfield user, you have probably detoured the misfortune of poor carburetion. It is the car-owner who has recently changed to a Rayfield from some other make of carburetor who is always most enthusiastic in his praise of the Rayfield; he sees the big difference and can well appreciate it.

Particularly in winter driving, the Rayfield Carburetor exhibits its ability at its best; once adjusted it stays adjusted and performs one hundred percent for flexibility, range, easy starting and fuel economy.

The Rayfield guarantee assures you that kind of service.

Findeisen and Kropf Mfg. Co.
2109 Rockwell Street CHICAGO



There are Rayfield Service Stations everywhere. Drive around to the one near you and have a Rayfield installed.

RAYFIELD

CARBURETOR

ARE YOU LOOKING *for*
a FINE TIRE?

Then—

DELION

Highest Grade
Lowest Cost Per Mile *Tires*

With us it is not so much a matter of getting merely *Distributors* as it is to get the "BETTER" *Distributors*.

We have a number of intensely enthusiastic Distributors before whose energy and confidence in DELION TIRES all competition seems to melt away.

It is they who have been consuming the DELION output nearly as fast as we were able to produce it.

Recently, however, factory enlargements and a new policy for co-operation with Distributors and Dealers with advertising and Dealer Helps, brings us conspicuously into the field of highest quality tires.

There is no reason why we should not sell as many DELION TIRES in Chicago as we do in New York. The former is only *one* of the wonderful territories open to the right folks.

With a tire *guaranteed* for 6000 miles—that MAKES GOOD—LOOKS GOOD—IS GOOD—That tire MUST BE THE TIRE FOR YOU.

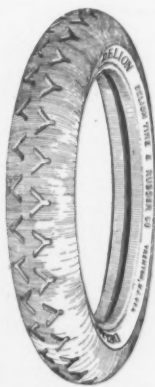
Of course there is money in it—Plenty of it.

DELION dealers are the proudest, most confident folks in the world when it comes to talking DELION Quality and their 6000 and more miles.

We invite correspondence from the "BETTER" Distributors and Dealers.

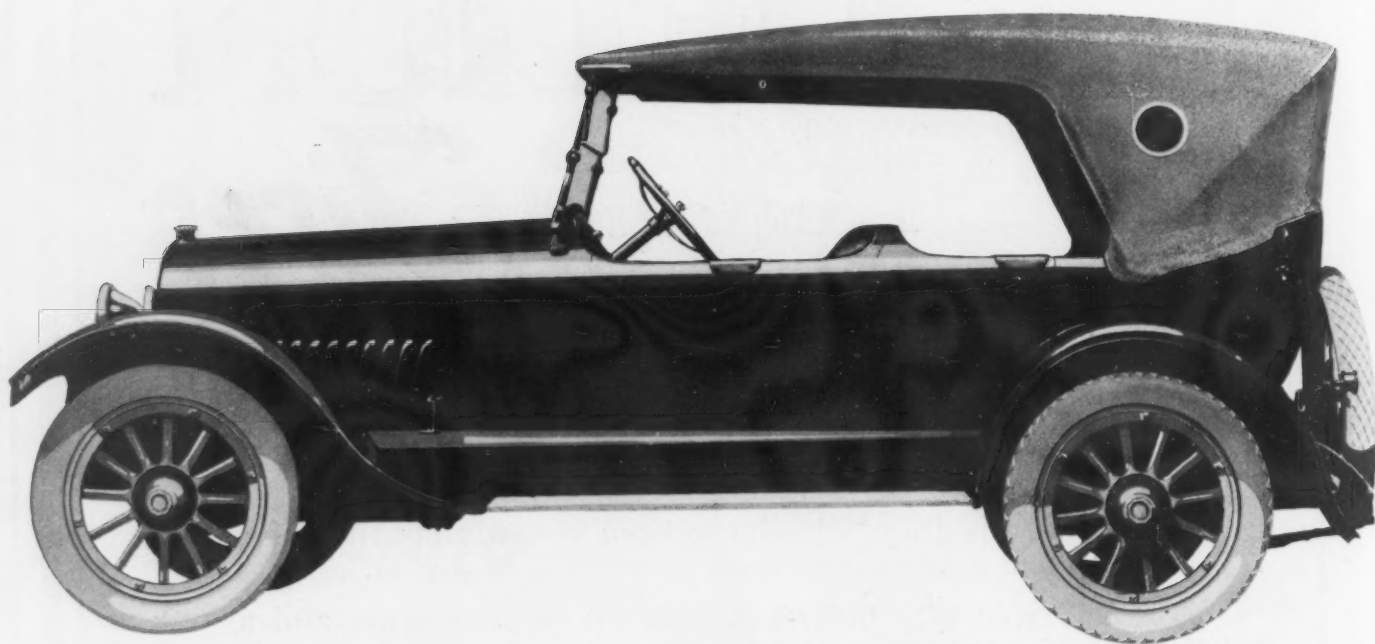
Delion Tire & Rubber Company, Inc.
1922 Broadway New York City, U. S. A.

FACTORY: TRENTON, NEW JERSEY



STEPHENS

Salient Six



Four Passenger

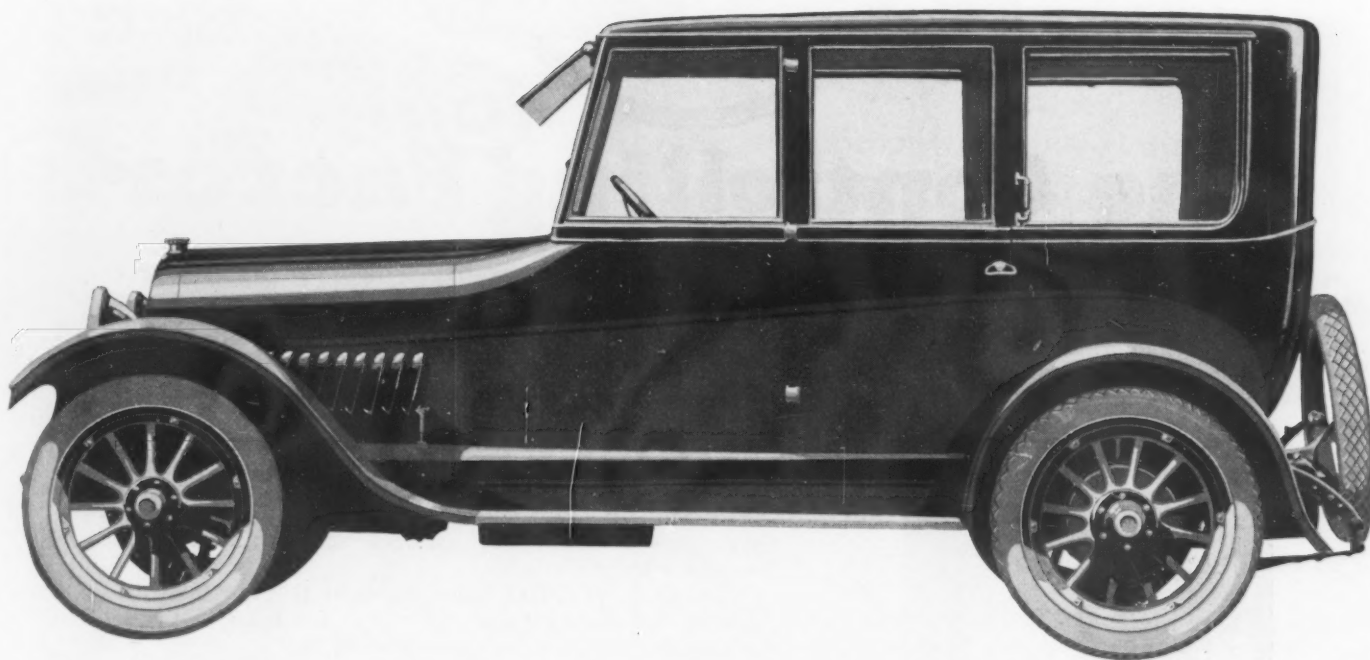
Roomy for four passengers; low; speedy looking; a fineness of equipment; the perfected type of four-passenger design. With its Semi-Victoria top, its Saginaw Red finish, its natural wood wheels, it again answers Stephens ideals—the car of conservative individuality. Possessor of the perfected overhead-valve engine that burns all the gasoline.

Price \$1550 f. o. b. Factory

STEPHENS MOTOR BRANCH

Sales Offices: Moline, Illinois

IN TWO NEW MODELS



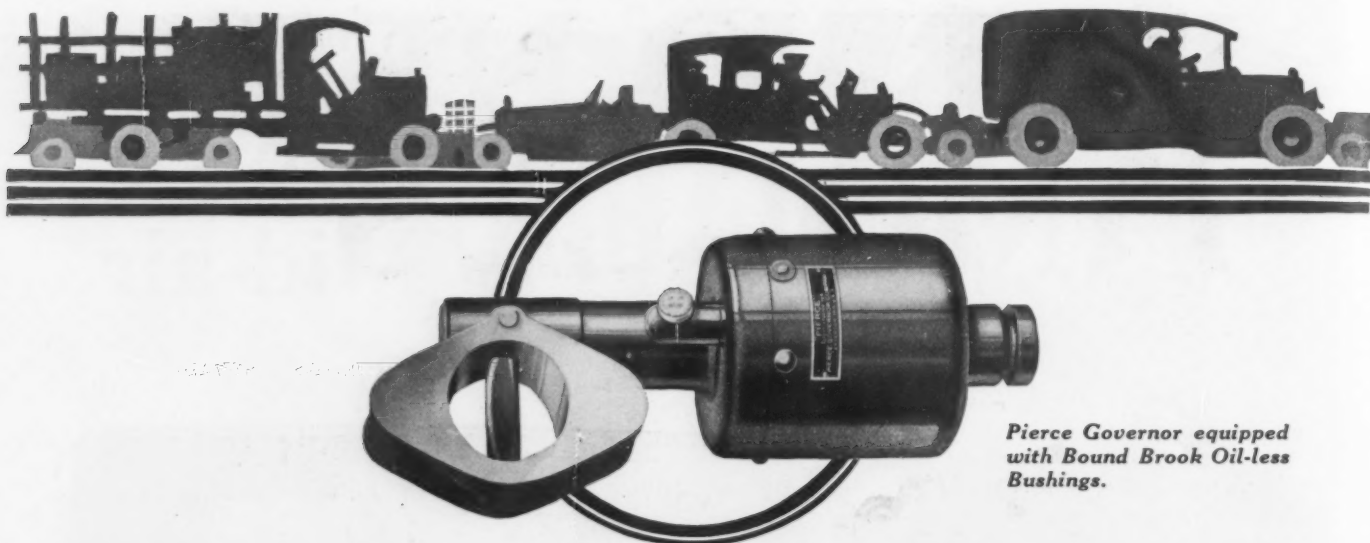
Touring Sedan

Stephens design — not built under license. The harmony of lines; the Stephens hand finish as usual. The one sedan which is positively weather proof. Whipcord upholstery, divided front seats, Yale locks in the doors—there is nothing lacking, and many new refinements added. It is the complete sedan, on a chassis renowned for *ability*.

Price \$1985 f. o. b. Factory

CH^f MOLINE PLOW COMPANY

Factory: Freeport, Illinois

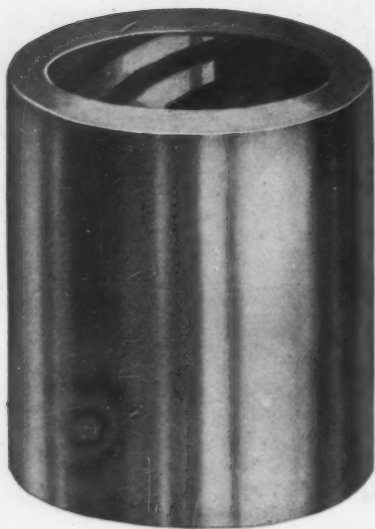


*Pierce Governor equipped
with Bound Brook Oil-less
Bushings.*

The Controlling Factor

must be fool-proof and trouble-proof. Therefore the Pierce Company has equipped their famous GOVERNOR with

BOUND BROOK (Trade Mark Reg. U. S. Pat. Off.) OIL-LESS BUSHINGS



The Pierce Governor "takes care" of the truck, regulates its speed to prevent accident and undue wear and tear.

Obviously it must take care of itself. It must not be dependent upon the driver for oiling or other attention. It must run continuously with accuracy and smoothness, and outlast the truck.

BOUND-BROOK (Graphite-and-Bronze) Oil-less Bushings help it to do this. They are made of finest phosphor bearing bronze so designed and constructed as to retain lubricating graphite. This lubricant is specially prepared and is part of the bushings themselves.

These bushings run efficiently with or without oiling, attended to or neglected. They are fool-proof, trouble-proof, neglect-proof.

Leading manufacturers of motor cars, airplanes and machinery of every conceivable description are using these bushings. In inaccessible places, subject to neglect, they give a quality and length of service that no ordinary bushing can hope to approach.

We also manufacture NIGRUM (Trade-Mark Reg. U. S. Pat. Off.) Impregnated Wood Oil-less Bushings.

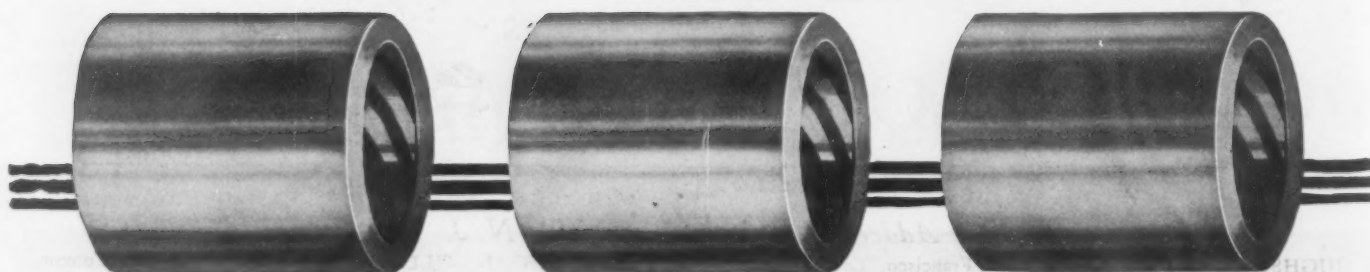
All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.

BOUND BROOK OIL-LESS BEARING CO.

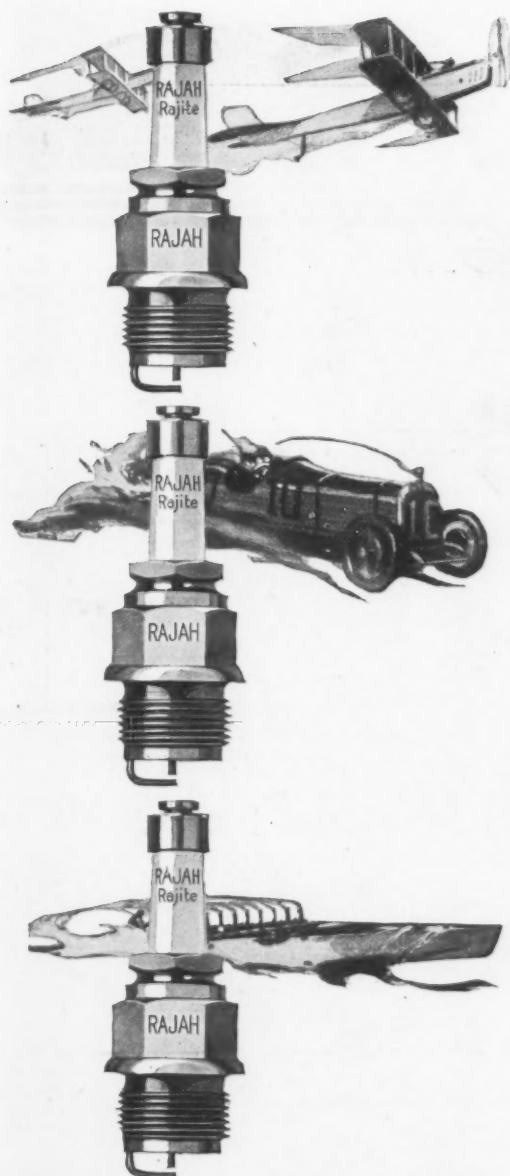
Specialists in the manufacture of Oil-less Bushings for more than a third of a century.

BOUND BROOK

NEW JERSEY



When Writing to Advertisers, Please Mention Motor Age



Supreme Afloat Ashore and in Mid-air

Rajah Spark Plugs are in their element in any element. Afloat, ashore and in mid-air, wherever the gas engine is put to the supreme test of power, speed and reliability, Rajah Spark Plugs are supreme.

These same Rajah plugs that are the choice of racing car drivers, airplane pilots and speed-boat builders and owners, are available for your trade. Can you ask a stronger endorsement or a surer proof of quality and service? Get a supply of Rajahs for the car owners in your locality.

RAJAH *SPARK PLUGS*

RAJAH TERMINALS AND ADAPTERS

are furnished so that Rajah Plugs can be used on any car not equipped with the Rajah type of Clip Terminal. Any size exchanged if desired



Rajah Regular Clip Terminal
Adjustable to any cable. With the extra collar supplied fits any make of plug.



Rajah Thumb Nut Terminal
Adapter for Dodge, Ford, Hup, Hudson, Maxwell, Mitchell, Packard Twin Six, Pullman.



Rajah Ferrule Clip Terminal
With any size ferrule required. Fits any make of plug with the extra collar supplied.



Rajah Packard Terminal
Adapter for Packard 4 and 6 cylinder.



Rajah Stud Terminal
Adapter for Buick, Chevrolet, Oldsmobile.



Rajah Ball Terminal
Adapter for Franklin.
Special type for Willys-Knight.



Rajah Priming Plug

Address **RAJAH, Bloomfield, N. J.**

HUGHSON & MERTON, Inc., San Francisco, Los Angeles, Portland, Seattle. JOHN MILLEN & SON, Ltd., Montreal, Toronto

When Writing to Advertisers, Please Mention Motor Age



Just why Marathon hand-made tires cost more

You may take two samples of the same iron ore; out of one you will make a railroad spike; out of the other a main spring for a high priced watch.

You start with the same material; the finished products are widely different in quality and in price.

Apply it to automobile tires: start with the best rubber and the best fabric obtainable; the hand-made process, if it is conscientiously done by experts and carefully inspected at every step, will yield a product that is developed to the highest degree possible for service on your car. The machine-made tire will be only as good as machines can make it.

Marathon hand-made tires are built as fine as skilled hands and fine material can make them; you can't find a better tire anywhere.

Hand-workmanship eliminates weak spots; and it's the weak spots in your tire that cause the trouble, that cut short the life of your tire.

We believe in Marathon tires as we could never believe in a machine-made tire; you will, too, after you have driven your car a year on Marathons. Our absolute belief in Marathon hand-made tires is expressed in the kind of guarantee we make you on each tire; ask your dealer about that; it will probably be news to you in the way of a guarantee on an automobile tire.

THE MARATHON TIRE & RUBBER CO.

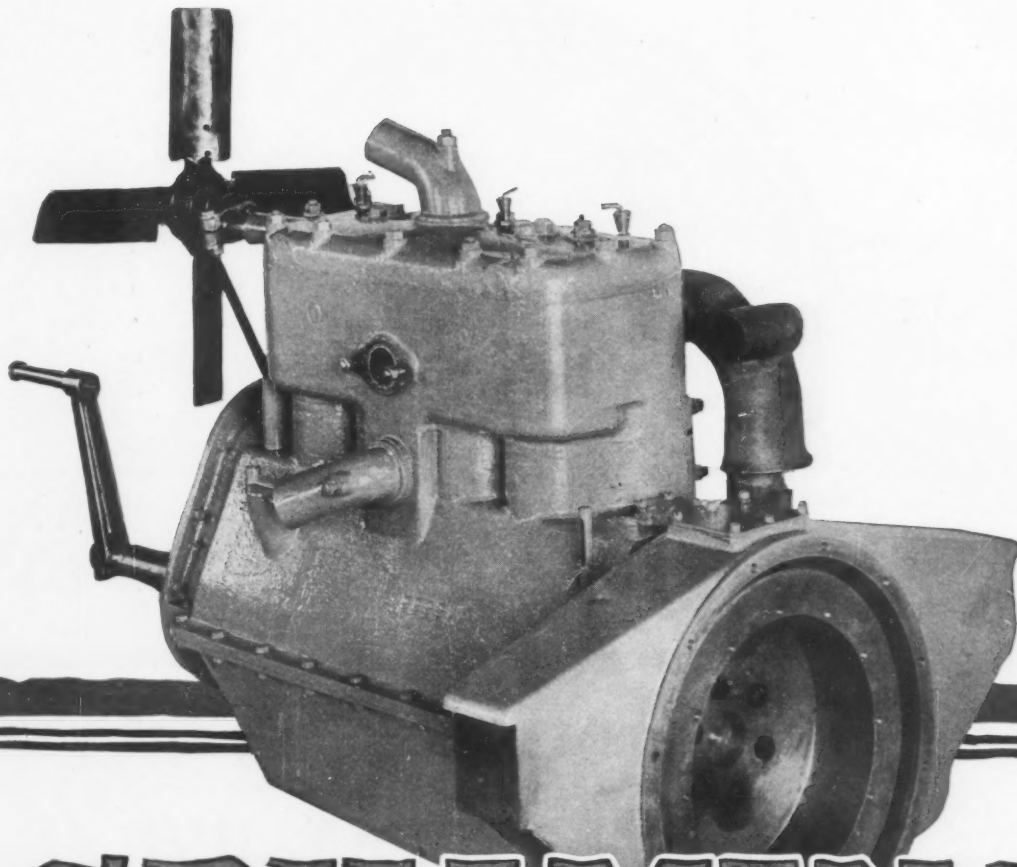
CUYAHOGA FALLS, OHIO

Canadian Factory, St. Catharines, Ontario

700 Beacon St.....Boston
549 W. 52nd St.....New York
1458 S. Michigan Ave.....Chicago

WAREHOUSES
3434 Locust St.....St. Louis
200 South Highland Ave. Pittsburgh

10213 Euclid Ave.....Cleveland
1809 Grand Ave.....Kansas City
55 Second St.....San Francisco



SPILLMAN 4

3 1/4 x 5 - 4 CYL 4

In the SPILLMAN "4" we offer a 4-cylinder motor of quality and power. Simply built, accessible, rugged.

The actual performances of this motor are astonishing, considering its size. Its speed, flexibility and hill-climbing attributes are unequalled by other motors of its class.

There is no question of our ability to deliver motors on such contracts as we accept.

Eights
3 1/4 x 5

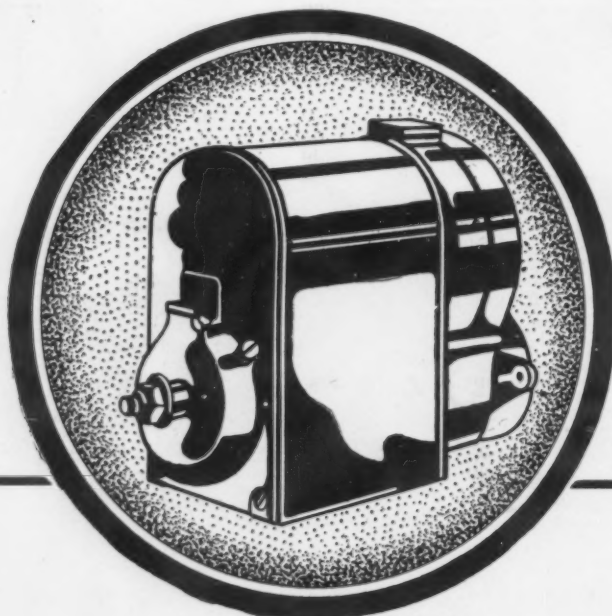
Fours
3 1/4 x 5

HERSCHELL-SPILLMAN COMPANY

Builders of Automobile Motors

North Tonawanda

New York



“Magnetos are a Mystery to Me!”

“Electricity isn't in my line. With *all* the makers so strong in their claims how am I to judge which Magneto will give me the best service?”

That is the attitude of many car owners toward the Magneto question.

Claims are poor things to judge by; *results* are what count, especially results in competitive tests. And since you can not easily make the tests for yourself, follow the decision of those car, truck and tractor builders who are most particular to use the best.

Truck service, with its heavy, constant strains and shocks, is where the differences between magnetos show most plainly. In the list of 81 truck builders who use Eisemann as standard equipment, appear the names which mean, most.

THE EISEMANN MAGNETO CO.

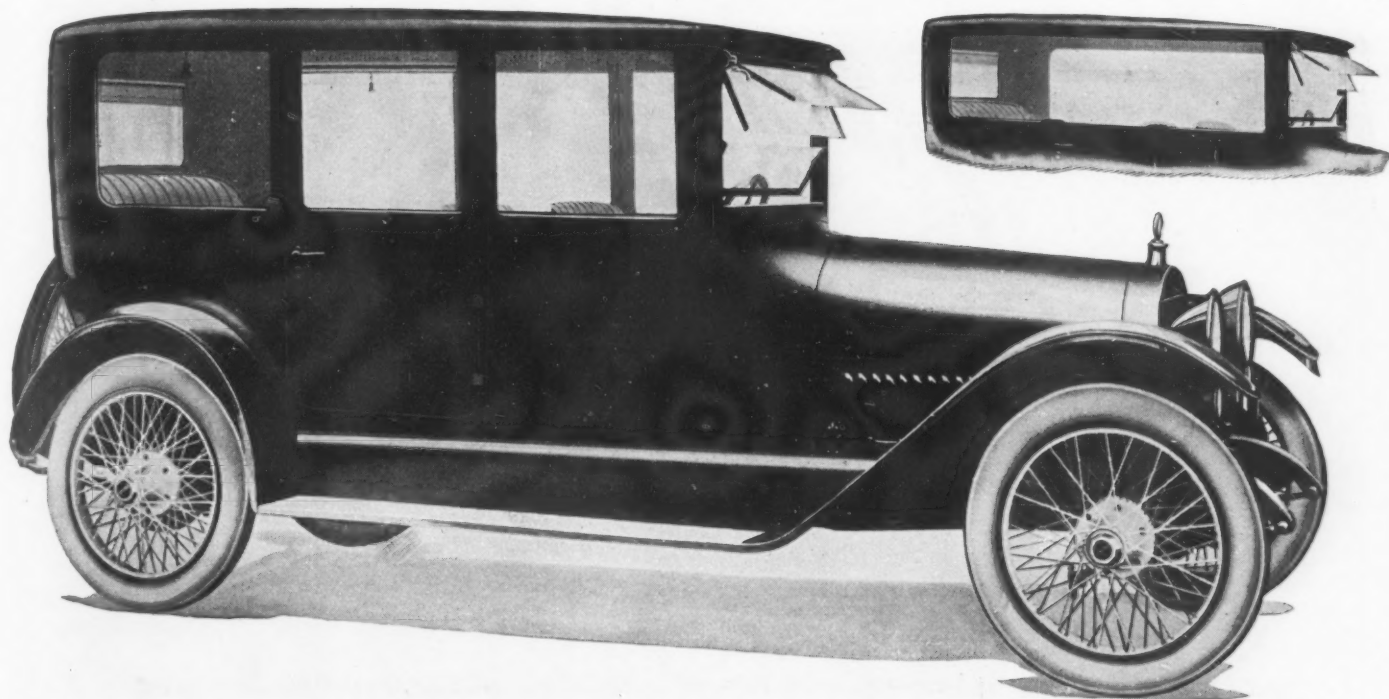
Sales and General Offices: 32-33d Street, Brooklyn, N. Y.

Chicago, Ill., 910 So. Michigan Avenue
Detroit, Mich., 802 Woodward Avenue

THE

EISEMANN

MAGNETO



The New Haynes Sedan

APPROVED by the dictates of Fashion for the 1918 Season, the new Haynes All-Season Sedan is a noteworthy offering.

The ultra-fashionable French pleated upholstery is of a serviceable, attractive gray. The seats are luxuriously cushioned and so shaped as to afford maximum comfort.

Curtained in gray silk, with gray side-walls and ceiling, the harmony of the interior is extremely pleasing.

A convenient switch floods the Sedan with light. The side windows at rear are completely removable, or drop half way, if desired. The other side windows drop entirely into the body. Doors are staggered. A Perfection heater is used. Four rich body colors are supplied.

Both Haynes "Light Sixes" and Haynes "Light Twelves" are available in these Sedans, as well as in equally smart Town Cars and Coupes. If you are a dealer, a most interesting proposition awaits you at this time. Write for details.

THE HAYNES AUTOMOBILE COMPANY 2 S. Main St., Kokomo, Ind., U. S. A.

25th Successful Year of

HAYNES

"America's First Car"



The World's Greatest Truck Owner

Many thousands of motor trucks, already ordered by the United States Government, are now in process of manufacture, and many additional thousands will be ordered. These will constitute by far the largest motor truck fleet in the world.

Their design is in accordance with that supreme principle of industrial efficiency emphasized by the Great War—Standardization. To observance of this same principle has been due the noteworthy success of the Continental Motor.

By reason of its basically sound design and its uniform excellence of construction, the Continental has firmly established its reputation, not only with manufacturers, but with dealers and the general public. It has won, fairly and without favor, the proud title of America's Standard Motor.

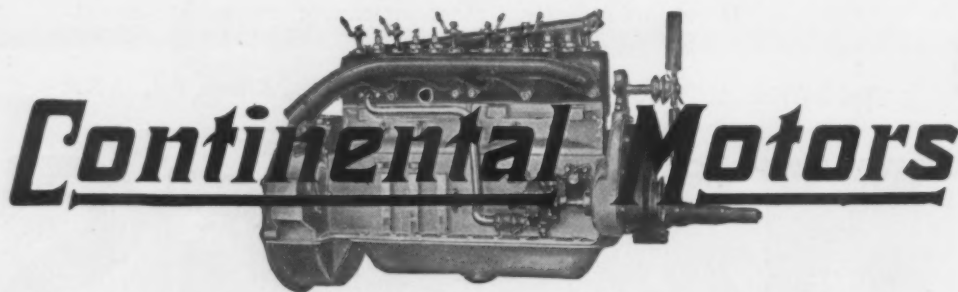
Apply the industrial lesson of the Great War: standardize. Adopt the Continental, America's Standard Motor.

CONTINENTAL MOTORS CORPORATION

OFFICES:
Detroit, Mich.

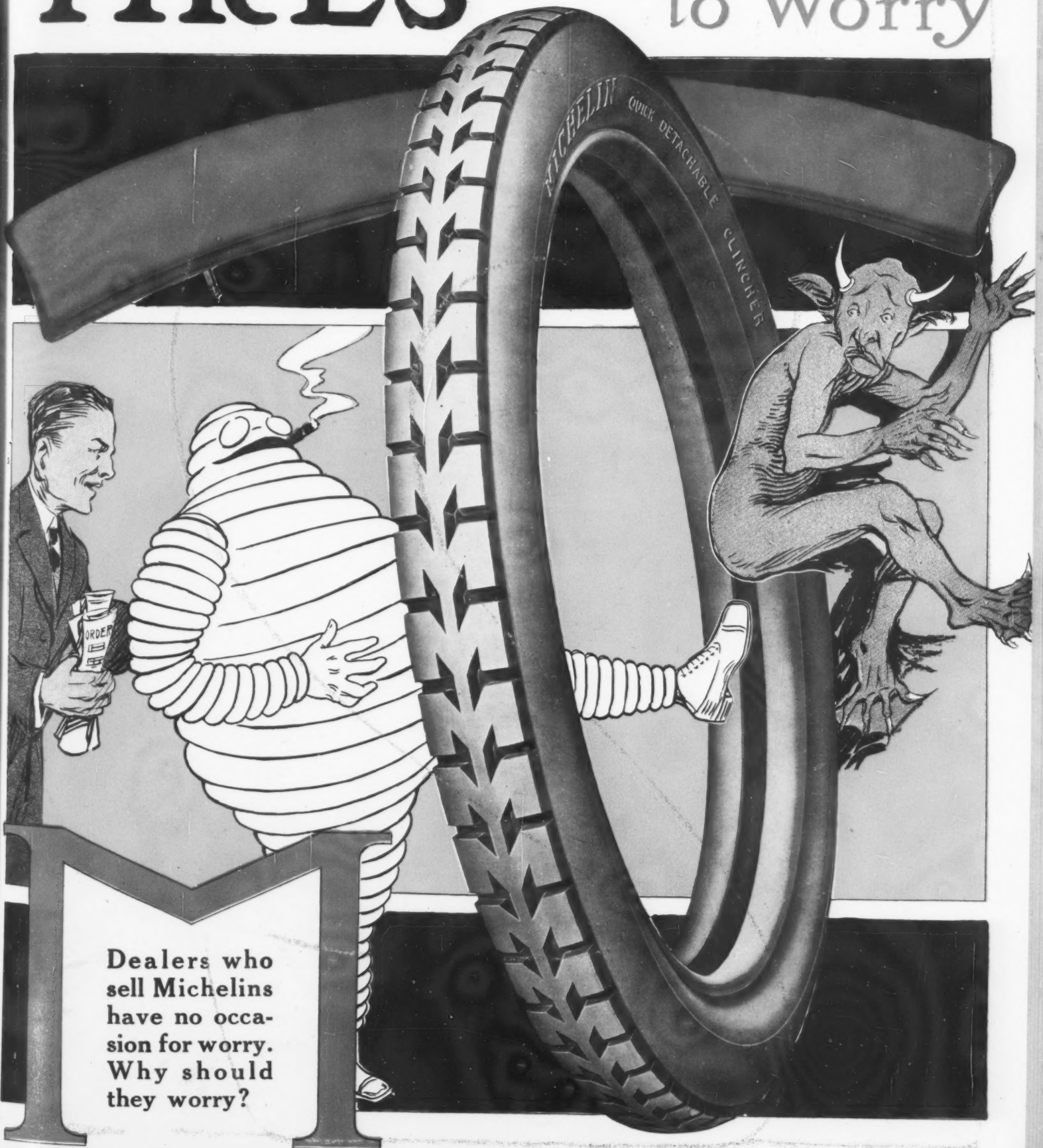
Factories:
Detroit, Muskegon

Largest exclusive motor manufacturers in the world



MICHELIN TIRES

mean an end
to Worry



Dealers who
sell Michelins
have no occa-
sion for worry.
Why should
they worry?

Talks to the Number



TIRE TRADE

YOUR SUCCESS, Mr. Dealer, depends primarily on two things:

1st. Your ability to get customers.

2d. Your ability to *hold* them.

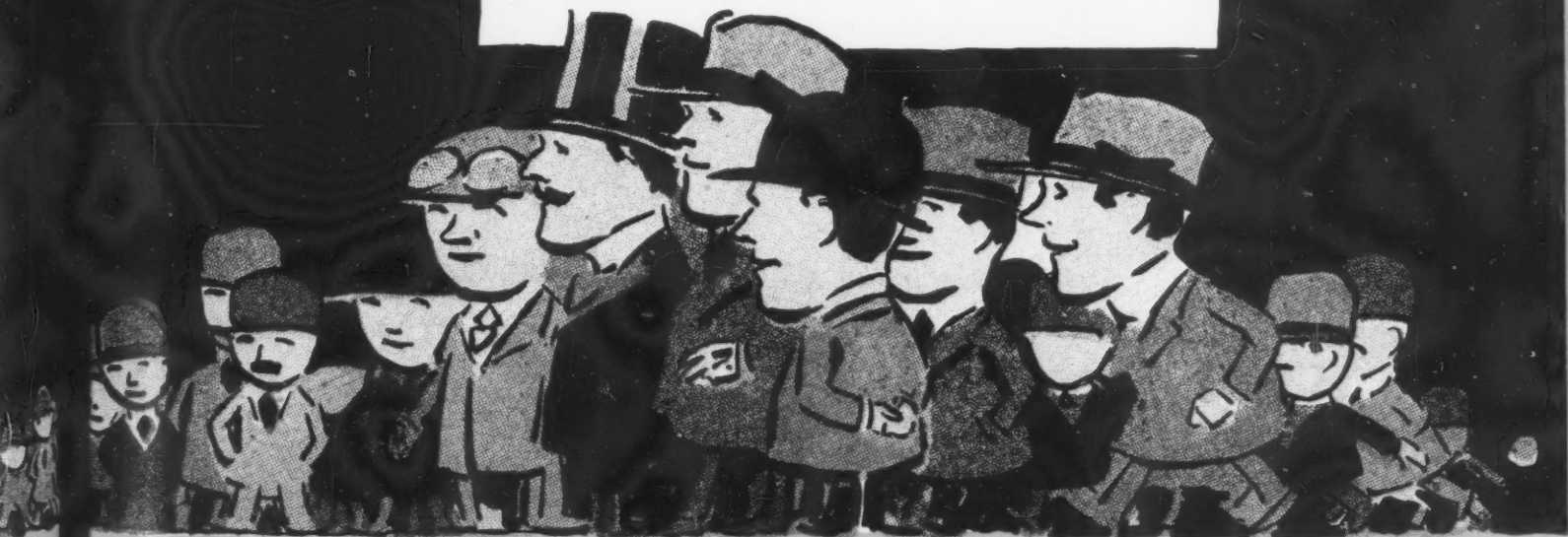
Michelin enables you to get new customers easily through Michelin's high quality, moderate price and extensive advertising.

And Michelin holds your customers for you through the unrivaled satisfaction which Michelin Tires give, leaving you free to develop your business along all lines.

Write us and we shall gladly send you details of the 1918 Michelin proposition.

Michelin Tire Company

Milltown, N. J.



Some Facts that Account for Michelin's Unequaled Durability

1. Michelin invented the pneumatic automobile tire. Longer experience is reflected in a better product.
2. More quality rubber and fabric go into Michelins than into other tires. Michelins weigh 12 to 15 per cent. more than other makes. When you remember that the extra weight of Michelins and the extra thickness of tread are all in materials of the *highest possible* quality, the above facts are conclusive.
3. The unique and time-tested Michelin tread, while a perfect non-skid, is also an ideal "driving" tire that steers as easily and smoothly as a plain tread. The reason for this is—
4. Instead of having small projections that wear off quickly, the Michelin tread is broad and flat—always presenting a large wear-resisting surface to the road.

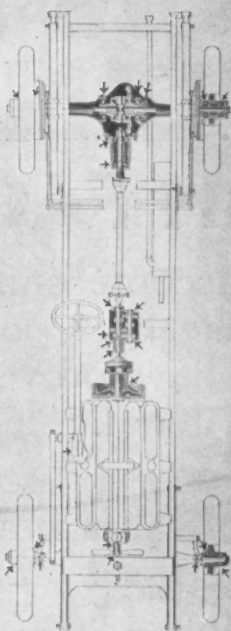
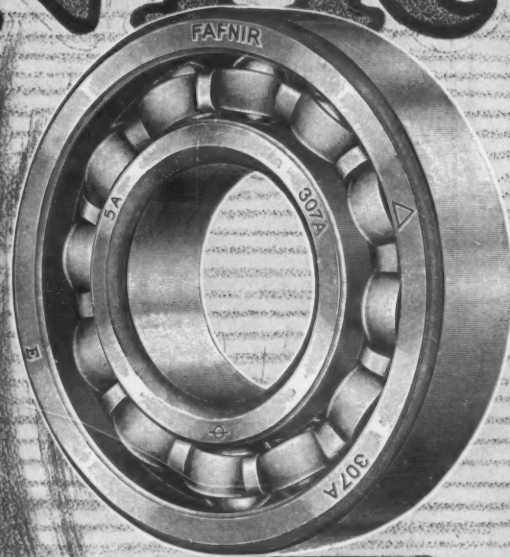
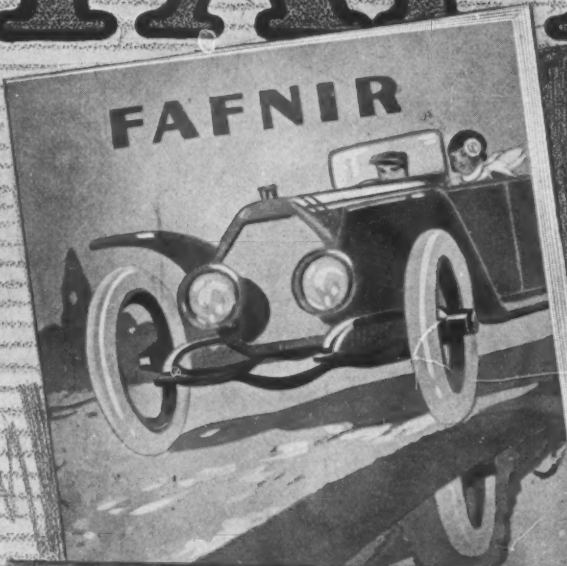
There is no better tire than the Michelin Universal at any price. Yet few quality tires cost so little.

Write us today for details of the Michelin dealer plan, which is just as far ahead as the Michelin Universal Tread itself.

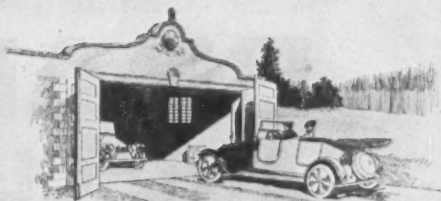
Michelin Tire Company
Milltown, N. J.



FAFNIR



General view of pleasure car chassis showing the location of ball bearings in the front and rear wheels, transmission, main shaft and differential, shock, steering knuckle, steering column and tie shaft.



Fafnir Ball Bearings for Pleasure Cars

In view of the abnormally high prices existing today, the prospective purchaser of a new pleasure car is vitally interested in all factors affecting the cost of operation and maintenance. Moreover, of the total horsepower developed by the motor, only that proportion which is transmitted through the bearings to the rear wheels is effective in driving the car forward. That power which is consumed in overcoming the frictional resistance of poor bearings is irretrievably lost, and may be sufficient in amount seriously to impair the efficiency of the motor. Furthermore, excessive friction means a corresponding amount of wear. Consequently, no part of the motor car is more cogently important than the bearings in relation to economy in gasoline consumption per mile and the cost of maintenance.

To illustrate what may be saved in gasoline consumption alone, let us suppose that gasoline

Choice of Bearings

A little book full of interest for the automobilist. To obtain a copy, simply sign and mail the attached coupon.

The Fafnir Bearing Company

Corrad Patent Licensee

Detroit Office: 752 David Whitney Bldg. Main Office and Factory: New Britain, Conn. Chicago Office: 1919 So. Michigan Ave.

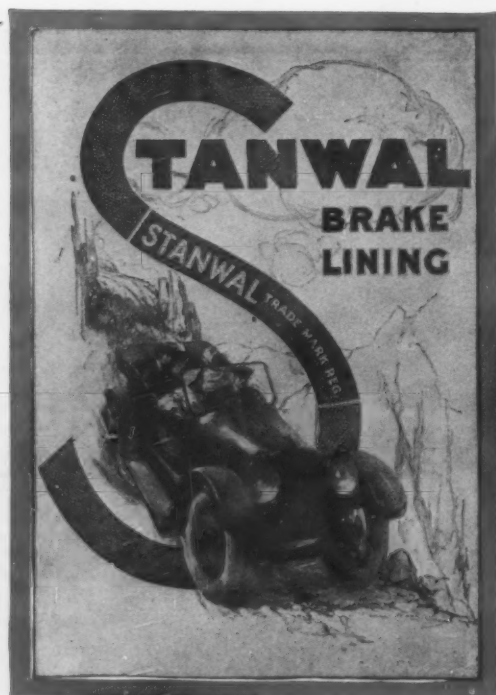
The
Fafnir
Bearing
Company
26 Booth Street
New Britain, Conn.

Kindly send a copy of your automobile book to the address given below

Name _____

Firm _____

Address _____



Stanwal is the result of years of experience in developing brake and clutch linings. It marks a distinct advancement in manufacture. It is an engineering achievement.

STANWAL BRAKE LINING AND CLUTCH FACINGS

Stanwal is the crowning accomplishment in a determination to produce the best possible brake and clutch lining. Tests have proved it superior to any other friction material. It sets a new standard of quality.

The primary base of Stanwal is brass wire covered and protected by a special fabric, specially treated, proof against frictional heat.

A feature of this improved fabric is the treatment which gives it the unusual frictional quality. With such care is it compounded that the heat-resisting quality of Stanwal increases as the frictional pressure is applied. In other words, Stanwal improves with use. The yarn from which Stanwal is made is carded and spun in our own factory, under the direction of our own experts. Every facility for the manufacture of quality goods has been provided in this factory—the largest and most complete one devoted to the manufacture of brake and clutch linings.

STANDARD WOVEN FABRIC CO.

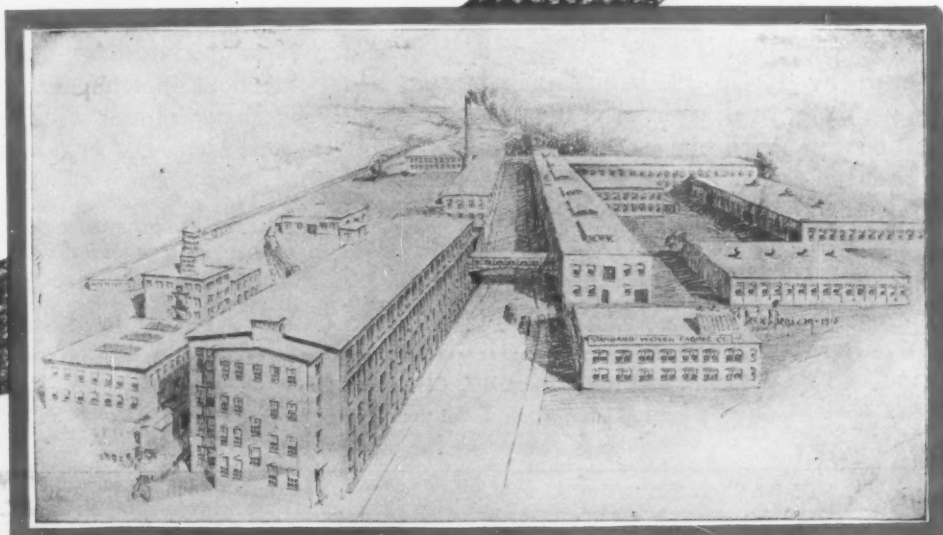
WALPOLE, MASS.

New York Branch and Export Office
1834 Broadway
Chicago Branch Office
1430 Michigan Avenue

Detroit Branch Office
306 New Telegraph Building
Philadelphia Branch Office
406 Colonial Trust Co. Building

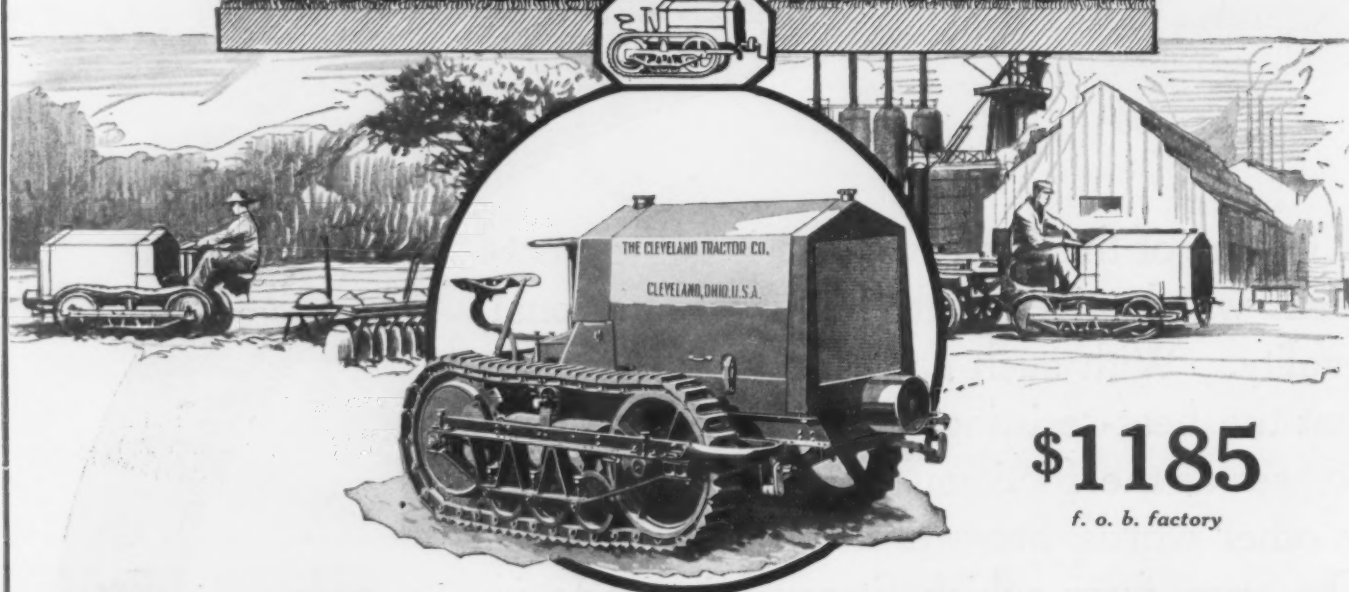
Other Stanwal Products

Stanwal Brake Lining and Clutch Facing
Stanwal Friction and Insulating Tapes
Splicing Compounds
Cable and Specification Tapes
Moulded Rubber Goods
Stanwal Matting
Stanwal Rubber Heels
Stanwal Fiber Soles
Tire Tape



When Writing to Advertisers, Please Mention Motor Age

Cleveland Tractor



\$1185

f. o. b. factory

Make Our Success Your Own

The Cleveland Tractor is meeting with a success second only to the most famous successes in the automobile industry.

It is distinctly different. It is an advance over the ordinary tractor as big as the modern automobile is over the sputtering, wheezing thing of fifteen years ago.

It is the one lightweight, economical crawler-type tractor. Because it *travels on its own track* it can go almost anywhere—through and over ditches, out of deep excavations, through wet clay, loose sand and gumbo.

It is easier to operate than an automobile. *It steers by the power of its engine.* Just a light pressure on the wheel and the motor does the rest. You can actually turn it in a 12-foot circle.

And here's a big, important point that will appeal strongly to you.

The Cleveland Tractor is designed, built and backed by Rollin H. White, probably the best known motor truck engineer in the country.

You can make our success your own. Other automobile dealers who have taken on the Cleveland are most enthusiastic over present sales and future prospects. The Cleveland is not a luxury. It is an absolute necessity—a money-making investment for

those who buy it. It is needed on every farm, in every factory, and in hundreds of widely varied lines of trade.

Our big advertising campaign has awakened farm and factory to the pressing need for Cleveland Tractors. Sales are being made with practically no effort.

Dealers are wiring, phoning and writing us daily for rush shipments, far in excess of their original contracts. We have doubled our entire plant since April 1. Now the demand is forcing us to redouble it. With our added facilities we will need more dealers to help us handle sales.

You can add the Cleveland to your line without materially increasing your overhead. You already have the show room and the service station. Now all you need is the Cleveland Tractor and a salesman to handle the business.

The Cleveland contract means money—big money—to good dealers—men who are awake to the tremendous opportunities.

Better wire or write us today. *Act now.* Address Dept. BV or use the coupon.

12 H. P. at bar.
20 H. P. at pulley.
600 sq. in. traction surface.
2750 lbs. weight.

52 in. high—50 in. wide.
4-cylinder, high speed
heavy duty motor.
Drawbar pull of 1500 lbs.

CLEVELAND TRACTOR COMPANY, Cleveland, Ohio

CLEVELAND TRACTOR COMPANY, Dept. BV, Cleveland, Ohio

Please send me full information about your dealer proposition.

Name _____ City _____
County _____ State _____



In the Making



In the Selling



In the Using



**RUST-PROOFS
IRON AND STEEL**

Now being used in the
Manufacture of

*Typewriters
Building Supplies
Automobiles
Motor Trucks
Motor Accessories
Electrical Equipment
Farm Implements
Ranges and Stoves
Steel Furniture
Sporting Goods
Phonographs
Dental Supplies
Railway Supplies
Telephone Equipment
Ornamental Iron Work
Arms and Ammunition
Etc., etc.*

Parker Rust-Proofing improves your product

In the Making; you usually keep a stock of various parts on hand for assembling. There is continual annoyance in handling these parts because of the action of rust. It is also expensive, unnecessarily wasting the time of your workmen.

The Parker Process eliminates all consideration of the subject of rust after the parts are made up.

In the Selling; every buyer is quick to appreciate the value of protection against rust. It means quicker sales—it means repeat sales. It is a talking point that is second to none—a quality that cannot be overestimated.

The Parker Process is the "clinching" sales argument.

In the Using; 23% of all iron and steel rusts away annually. And this rust is not only an appalling waste—but a daily nuisance. It causes more

dissatisfaction than any other element. Very often splendidly built products are rendered useless because of rust.

The Parker Process enables you to use iron and steel as usual and still secure the same results as with copper, brass or aluminum. It absolutely eliminates rust from your consideration.

These are strong statements that we are making—and we believe that you must be interested in learning whether they are true or not. We do not ask you to believe them simply as claims, but will welcome the opportunity to prove every one to your entire satisfaction.

Not only will we gladly perform any tests you desire on your own products, but we will welcome you at any time you care to visit our plant and see the Parker Process in commercial operation.

PARKER RUST-PROOF COMPANY OF AMERICA
DETROIT, MICHIGAN



"GOING OVER THE TOP" is a war time expression. We've adapted it to *our* top—the *Detroit Convertible Weatherproof Top*. There's no danger and plenty of enjoyment in going over our top. We go over it often now—in the past months we have been over it many times. We know its every part—that its framework is designed by trained engineers—fashioned by expert woodworkers—made as strong, durable, shapely as it's possible to make a top.

Its clean grained hardwood frame is reinforced by light, tough sheet steel. Huge presses have stamped its metal sash. Then—every part is weatherproofed. Every joint made snug and tight. Rear and side glass

panes set firmly and rattle proof. And then the flexible sliding extra wide doors that contain no glass but a material clear as glass made to slide up, to slip out of sight into the top itself.

DETROIT
DETACHABLE
WEATHERPROOF
TOP

Detroit Weatherproof Body Company

202 Saginaw Street

PONTIAC

MICHIGAN

the "TOP"

You can have your Detroit Weatherproof Top NOW!

DETROIT
DETACHABLE
WEATHERPROOF
TOP

Retail Price List

Over the whole framework is securely and permanently shaped the patented weatherproof covering. The same material protects the sides. The interior is lined with rich limousine cloth. It's the distinctive Detroit Convertible Weatherproof Top—*The Top at the Top*.

A Rich Line for Dealers

Dealers sell Detroit Weatherproof Tops to far-seeing customers or to customers who blow in with the November storms.

There's a market for Detroit Weatherproof Tops in your territory from which some dealer will make money. That dealer may as well be you. Cut the coupon, send it today for sales plan and full information.

Detroit Weatherproof Body Co.

202 Saginaw Street

PONTIAC

MICHIGAN

For the present we manufacture tops for the following cars only:

Ford Touring	\$ 87.50
Overland Model 83—5 Pass.	115.00
Buick D45 Light 6.	140.00
Chalmers 6-30—5 Pass. (including rain vision visor to be fitted to standard windshield)	185.00
Chandler 1917, 1918 (including 3 piece built-in windshield)	185.00
Hudson Super Six Touring (including 3 piece built-in windshield)	190.00
Chevrolet Model Four-ninety as adapted to 1916-17-18 models	110.00
Maxwell Touring, \$145; Roadster	130.00

COUPON

Detroit Weatherproof Body Co.
202 Saginaw Street
Pontiac, Mich.

Gentlemen: Kindly forward full details relative to "the Top at the Top" for a.....car.

Name

Address

FOR DEALERS

Kindly forward dealers' terms, discounts, etc. I'm in the business.

Name

Address

PAIGE

The Most Beautiful Car in America

STABILITY

If you are an experienced, intelligent, successful motor car dealer, you refuse to "take on a line" until you have been "shown." In that you are entirely right. There are certain basic facts you must know—and know absolutely. You must be satisfied that both the company and the car are "right." Let us see what those fundamental essentials are:

You must be satisfied that the car is well designed and well built; that it will give service and satisfaction to your customers whose confidence you enjoy; that it will "stand up" and not eat up your sale-profits in service to keep it running and to keep your trade; that it is well advertised and won't require too much sales effort to introduce and sell. Those are a few of the car requisites.

You must be satisfied that you are going to get co-operation and expert advice and assistance from the factory that has made many a dealer a success; that the company has the reputation of making good cars and keeping them good; that you will receive advertising help, selling help and delivery help; that you have strong men, intelligent men and honest men back of you.

Those are all essential things. You have the right to expect and demand them.

Paige Dealers Get Them All But Is That All?

It is not. We have omitted one safeguard that is—in these times particularly—the most important of all.

That is the Stability of the Company. That word Stability means many things. It means years of experience in designing, manufacturing and selling motor cars. It means scientific management, conservative policies, efficient organization. It means the constructive methods that have won success. It means low overhead, no bonded indebted-

ness, AAA credit and a big surplus. It means brains plus experience plus limitless resources. It means a company with ample experience, ample organization, ample prestige and more than ample financial resources to meet any emergency.

The wise dealer today is he who safeguards his own future by allying himself with the company that will survive and grow and prosper.

Fifteen hundred of the country's best dealers know that such protection is to be found beneath the banner of the Paige.

PAIGE-DETROIT MOTOR CAR COMPANY, DETROIT, MICH.

WHAT THEY ALL SAY MUST BE TRUE

—and most of the large manufacturers concede that the big line of rubberized, waterproof fabrics made by the L. J. Mutt Company, is the most desirable, the most attractive, the most durable, and the most practical in the manufacture of automobile tops, upholstery and side curtains.

Our specialties—such as—

BULL DOG QUALITY FABRICS



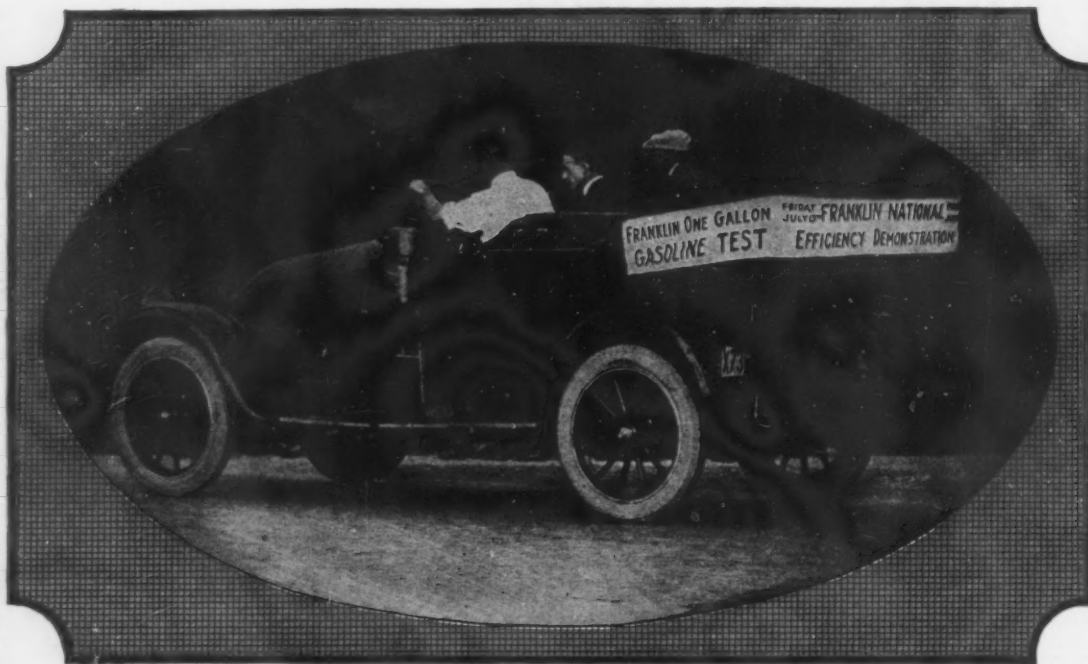
are absolutely guaranteed, and are the standard by which comparisons are made.



DrideK is a waterproof material, in leather or rubber finish, that is ideal for automobile tops. Send for samples and prices. They will interest you!

L. J. MUTT COMPANY
Boston, Mass.

*Atwater Kent Equipped Franklin Car
Sets New World's Record for Gasoline Mileage*



This Franklin Car, having the standard Atwater Kent Type K-2 Equipment, and driven by Cowles Tolman, of New Haven, Conn., established a new world's record for a stock car, running 82.8 miles on one gallon of gasoline

ATWATER KENT

SCIENTIFIC IGNITION

ON July 13, 1917, one hundred and seventy-nine Atwater Kent equipped Franklin cars, participating in the Franklin National Efficiency Demonstration in all parts of the United States, recorded an average of 40.3 miles to a gallon of gasoline.

Atwater Kent Ignition was a big factor in the establishment of this new world's record for gasoline mileage. Its hot dynamic spark and maximum power impulses make for velvety acceleration, reduced gear shifting and motor stalling, and easier starting.

Consider these facts when selecting the ignition system you will offer your trade—that Atwater Kent Ignition has been adopted by over thirty manufacturers as standard equipment, that it is extensively advertised, that it enjoys a reputation for quality based on a manufacturing experience of fifteen years. *Write in for our dealer offer.*

ATWATER KENT MFG. WORKS
Philadelphia

WRITE FOR INFORMATION TO 4934 STENTON AVENUE, PHILADELPHIA, PA



MOON MOTOR CAR CO.
ST. LOUIS, MO. U. S. A.

Expert or novice, the man who doesn't know the price of a Moon never thinks of guessing less than \$3000.

The New

1918 MOON Cars

Six-45

7-pass. Touring and Club Roadster

\$1685

f. o. b. St. Louis

Six-66

7-pass. Touring and Club Roadster

\$1850

f. o. b. St. Louis

emphasize this characteristic distinctiveness of appearance, finish, dependability and hardihood that are so obviously the combined work of the expert designer, coach builder and mechanic. No matter what type you want, you will find its smartest, most reliable expression in the corresponding 1918 Moon model.

The New Moon Six-36

—latest addition to the Moon line, and a car that has "caught on" big. Priced for the man of moderate means who wants six-cylinder superiority—very economical to run.

The Moon Six-36 is quite up to the standard set by the Six-45 and Six-66 for extreme stylishness and smooth-running and stand-up qualities—114-inch wheel-base—up-to-the-minute in its appointments. Equipment includes Continental Red Seal 27 $\frac{1}{8}$ x4 $\frac{1}{2}$ -inch motor, developing 36 horsepower—Spicer joints—Timken bearings—Fedder radiator—true honeycomb—and double cowl—both extra high.

\$1195

f. o. b. St. Louis

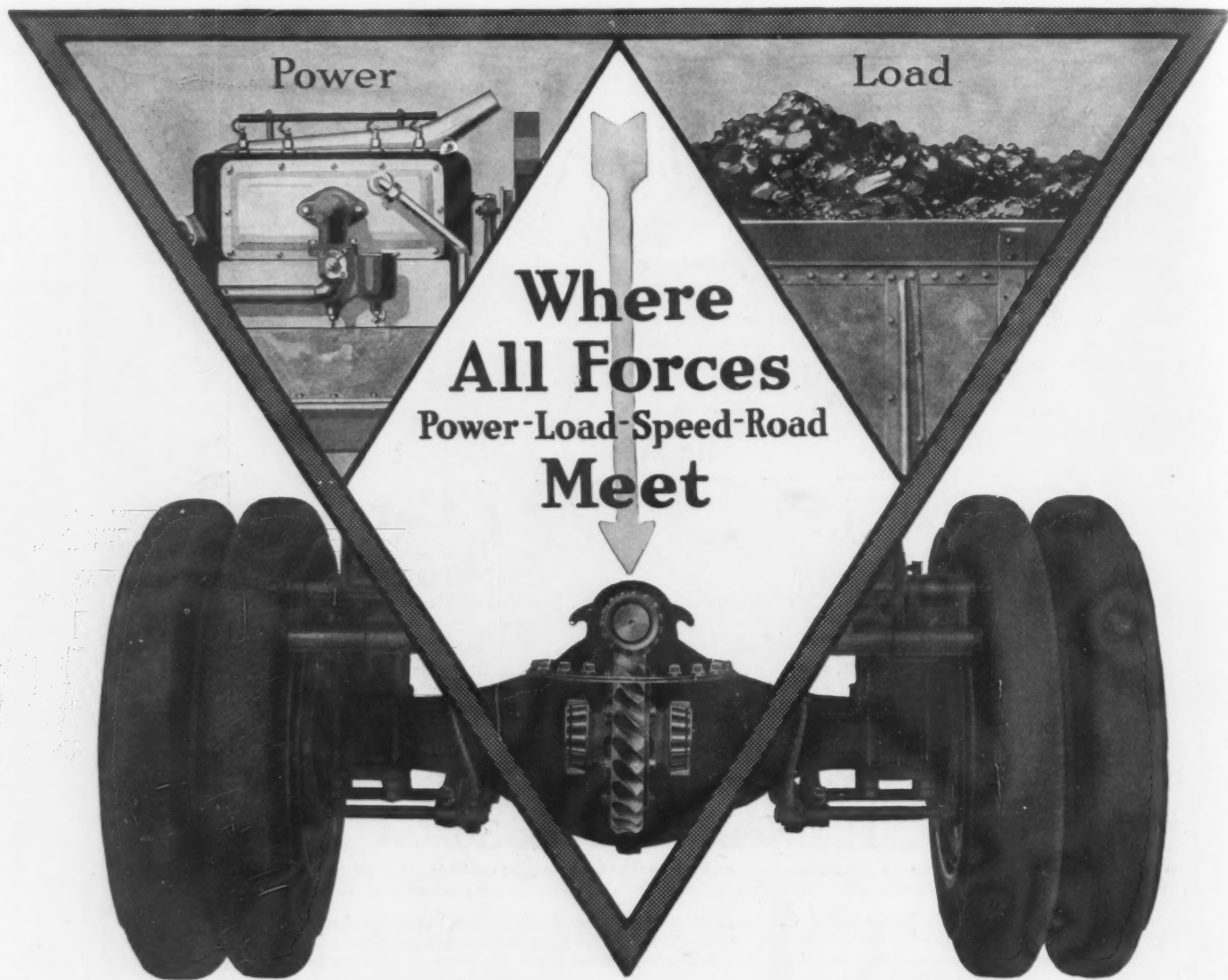
The unusual value offered in a Six that will sell at the price of the medium-priced Four, coupled with the information that the factory has been increased in size to manufacture 10,000 of these cars, has been interesting to both consumer and dealer. Dealers everywhere have been quick to see the selling possibilities and seize the open territory by wire as well as personal trips to the factory. Some choice locations still open.

MOON MOTOR CAR COMPANY
St. Louis, U. S. A.

Prices subject to change
without notice.



When Writing to Advertisers, Please Mention Motor Age



Where engine power forces gears to turn under the increased load at starting, climbing hills or struggling through muddy ruts and deep sand.

Where the bumps in the road jam the axles up and the load hammers them down.

Where careless driving at high speed, shakes, rattles and jars the whole mechanism.

The final responsibility for *commercial* haulage rests on the part where *all* the forces of wear and tear combine in greatest measure—the *rear axle*.

Your only real assurance of axle quality is the actual record of long years of performance—such as Timken-Detroit Worm-Drive Axles have had since the day the first one went into service.



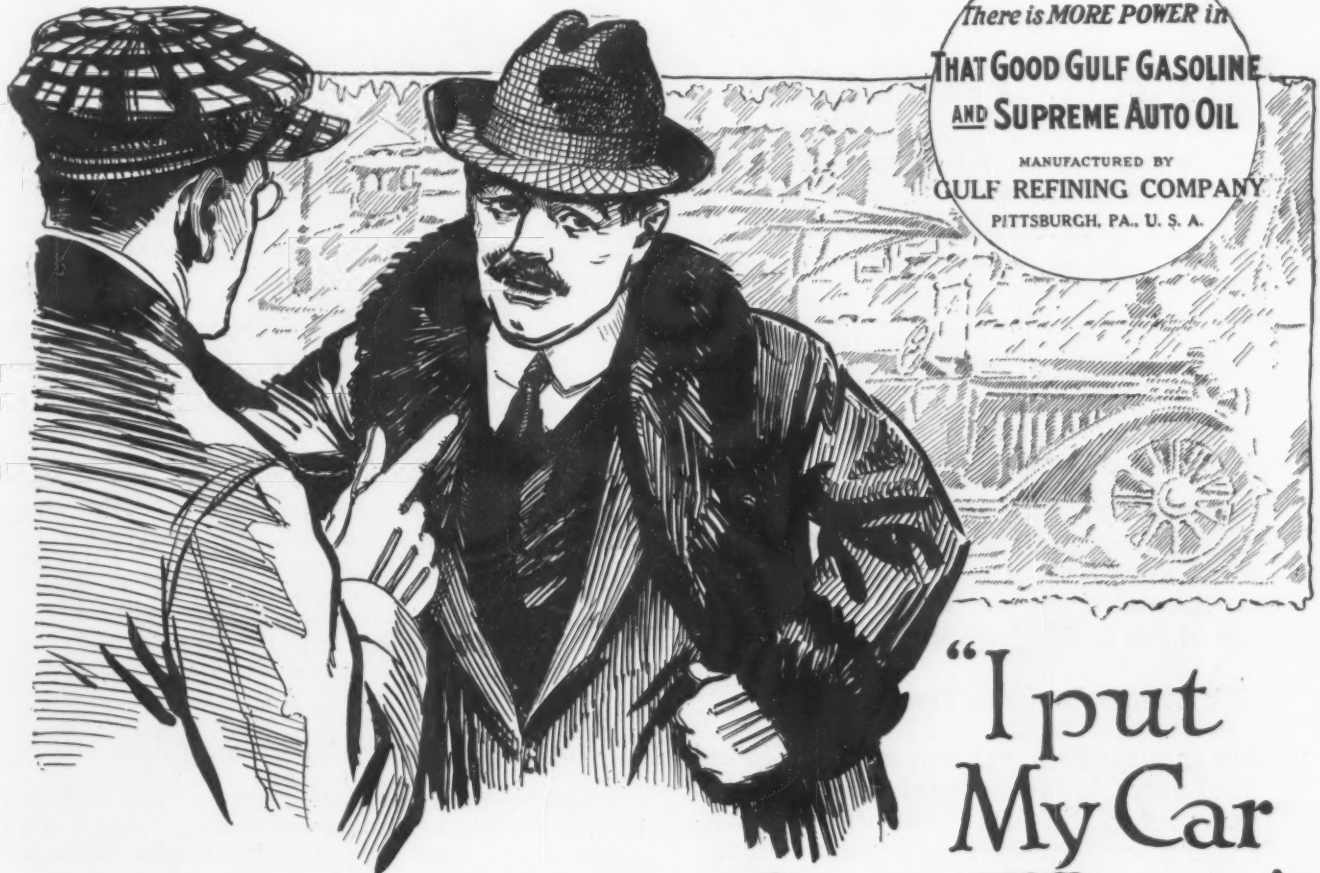
THE TIMKEN-DETROIT AXLE COMPANY
Detroit, Michigan



TIMKEN-DETROIT WORM-DRIVE AXLES

For Efficient COMMERCIAL Haulage

When Writing to Advertisers, Please Mention Motor Age



There is **MORE POWER** in
THAT GOOD GULF GASOLINE
AND SUPREME AUTO OIL

MANUFACTURED BY
GULF REFINING COMPANY
 PITTSBURGH, PA., U. S. A.

**"I put
 My Car
 up for the Winter!"**

"The Old, Old Story Oft Repeated—

Unsatisfactory lubrication—Oil would not flow at Zero—
 Scored cylinders."

"It's different now—I have found an oil which 'Flows
 Freely at Zero'—gives perfect lubrication and leaves less
 carbon."

"I run her all year 'round on

SUPREME AUTO OIL

Sold everywhere you see the Sign of the Orange Disc.

MANUFACTURED BY

GULF REFINING COMPANY

The Largest Independent Refining Company in the World

General Sales Offices: Pittsburg, Pa.

District Sales Offices:

New York

Philadelphia

Boston

Atlanta

Tampa

New Orleans

Houston

"X" welds leaky radiators without metal or fire!

EVERY thinking motorist realizes that if he neglects a leaky radiator he risks serious damage to his engine. And every time a leak develops, he faces the same problem—*what can be done about it?*

Between the repair man's bill of ten to twenty-five dollars for soldering leaks and the numerous "radiator compounds" offered him for a fraction of a dollar, the advantage seems to be all with the compounds.

But it is plainly apparent that when cements, powders, meals or glue are put into the cooling system, such solids must inevitably settle into the circulating space and cut down the efficiency of the cooling system.

"X" Welds Leaks in Ten Minutes!

Today thousands of car owners have found in "X" Radiator Liquid, the *final answer* to this problem. "X" is the first scientific preparation for the quick, *permanent* repair of leaks in the radiator, pump, connections, motor head gasket, and water-jacket of a motor car.

It has been on the market for nearly two years. Thousands of motorists are using it. Every alert dealer in auto supplies is selling it—and his business in "X" is growing every day.

\$1.50 Size does a \$25 Repair Job
Ford Size 75c, does a \$10 Repair Job

No bother, no tinkering, no fuss—nothing to take apart. Just pour "X" in and it works automatically. Keep "X" in the water constantly; it is a preventative as well as a cure.

"X" LABORATORIES, 630 Washington St., Boston, Mass.

Factory Representatives:

Gray-Heath Co., Chicago; Hughson & Merton, San Francisco
 Asch & Co., New York; Sanford Bros., Chattanooga, Tenn.

Distributors for Canada:

Canadian "X" Laboratories, Walkersville, Ontario

"X" RADIATOR LIQUID
 TRADE MARK

"X" is not a "radiator compound"—but a scientific process of welding without metal or fire.

You simply pour "X" into the radiator. It instantly combines with the water, and circulates throughout the cooling system. Whenever "X" in solution with water, flows through a leak, the action of the oxygen in the air immediately changes it to a *metallic solid*, forming a *permanent weld right in the hole*. The roughest road vibration cannot loosen it—and it will withstand a pressure of over 500 pounds.

Makes Radiators Rustproof and Scaleproof!

Now it is a remarkable fact that in addition to sealing leaks, "X" Radiator Liquid neutralizes the corrosive elements in water. In this way it prevents the metal from rusting. Moreover, it holds in the water the mineral matter which would otherwise form scale on the metal walls. Thus "X" keeps the inside of the cooling system clean and bright and the water passageways free and clear.

Improves All Water Cooling Systems!

85% of the water cooling systems are choked up by rust and scale—causing overheating and poor engine performance. *Your cooling system will be measurably improved by the use of "X".*

Beware of imitations! Don't put anything into your car that you're not sure about.

"X" is recommended by radiator manufacturers and endorsed by automobile engineers. It is the only scientific process for making cooling systems Leakproof, Rustproof, Scaleproof.

DEALERS! GET this EXTRA PROFIT ASSORTMENT

Special Offer
to
Dealers

Display Stand
and
\$1.50 Can
FREE!



"X" Liquid works in alcohol or other anti-freeze solution. You can sell a good many cans during the winter months. Keep "X" in stock. Every motorist that walks into your store should walk out with a can of "X".

\$1.50 in EXTRA PROFIT

The special assortment of nineteen cans of "X" includes twelve 75-cent cans and six \$1.50 cans. Also one \$1.50 CAN FREE. Assortment costs you \$12—sells for \$19.50. Selling literature, posters, etc., included in each assortment.

Ask Your Jobber, or
Write Direct Today



GET ACQUAINTED WITH AMAZON

ANNOUNCEMENT TO JOBBERS AND DEALERS

This announcement is the first of a series of advertisements that will appear regularly in this publication under the caption of "Getting Acquainted With Amazon."

Various points to be discussed are:

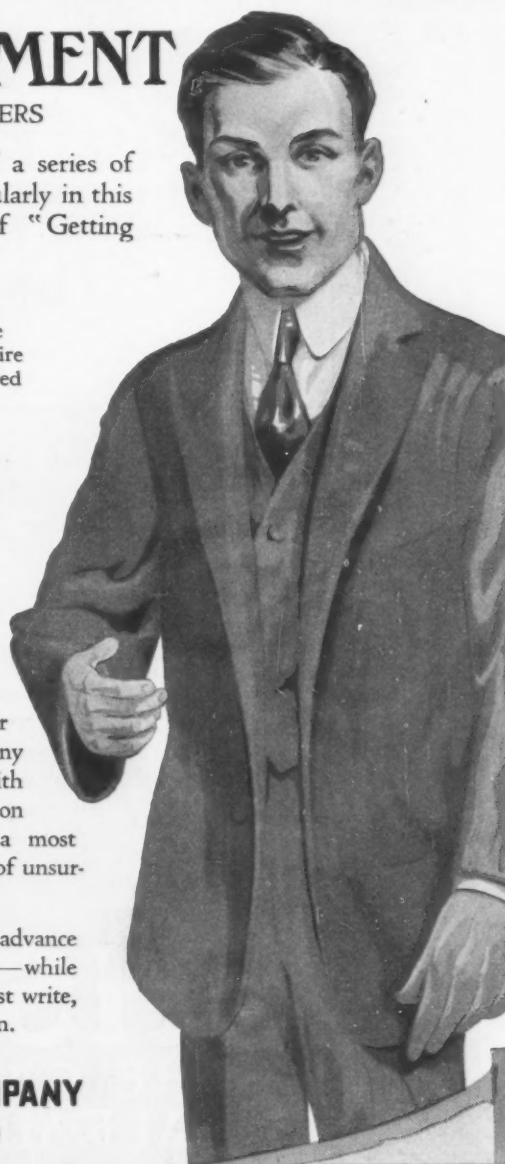
1. The TREAD of the Tire
2. The CARCASS of the Tire
3. Exclusive Territory Offered
4. Free Advertising
5. The PROFITS
6. Permanent Customers
7. Our Cordial Relations
8. PROOFS of all Claims

To enable you to easily recognize and follow these discussions as they appear, the same figure will be used throughout the series—look for his cordial smile—it is indicative of Amazon.

By the time you have read the entire series, we are sure you will be seeking our proposition to jobbers and dealers. Many will not wait—but will get in touch with us and secure full advance information direct from the factory. We have a most interesting proposition—and a TIRE of unsurpassable merit to back it up.

If YOU would like to learn now in advance the details of what we have to offer—while your competitor may be "waiting"—just write, wire, phone or call on us here in Akron.

THE AMAZON RUBBER COMPANY
AKRON, OHIO



Why I Picked the Wonderful Briscoe *Serlis*

KANSAS CITY,
MO.

"The automobile dealer can make real money only when the car he sells delivers the goods—when he offers best quality at the price. That is why I chose the Briscoe.

"This year I have found it easy to sell 1200 cars in my territory—4 cars per day for each working day in the year.

"Why? Because the famous half-million dollar motor furnishes inexhaustible power—because it gives 25 to 30 miles per gallon of gas. Because the Briscoe comes in all wanted designs in exceptionally beautiful finish.

"I consider the new Briscoe mechanically perfect. I have had mighty little trouble with any car sold. Every Briscoe owner is a hearty Briscoe booster. The car's the prettiest, all-round best-looking car of its class I ever saw—and I've studied all of them."

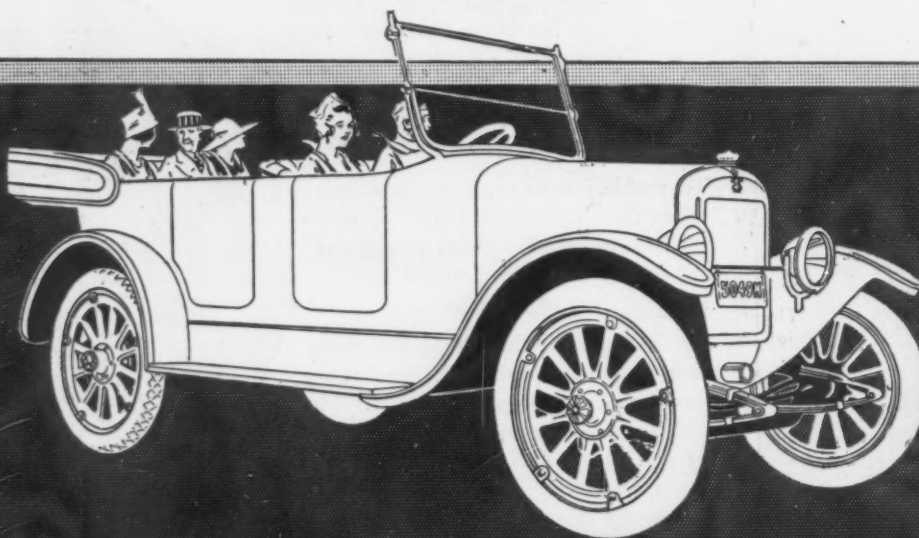
Serlis Motor Company

4 SALES PER DAY THE YEAR ROUND!

Do you do a business like that? Can you match Serlis's success? Investigate the money-making Briscoe. The franchise is worth thousands of dollars a year. Address

Briscoe Motor Corporation

Dept. 128, Jackson, Mich.



BRISCOE \$725

THE CAR WITH THE
HALF-MILLION DOLLAR MOTOR



Columbia Axle

Higher Standards

The establishment and maintenance of higher standards

- of engineering
- of materials
- of workmanship!

The equalizing of the higher cost entailed by such higher standards

—by scientific low cost production methods!

This accomplishment offers the producer of motor cars better axles than are obtainable elsewhere without excess cost for the excess value.

We are ready to prove the accomplishment if you are ready to avail yourself of the opportunity.

The Columbia Axle Company
Cleveland, Ohio.

Tillotson

CARBURETOR

The air valve is to a carburetor what the heart is to the human body—a mighty important part. In either case if the action is "off," trouble is bound to result.

In the Tillotson Carburetor the action of the air valve is absolutely automatic.

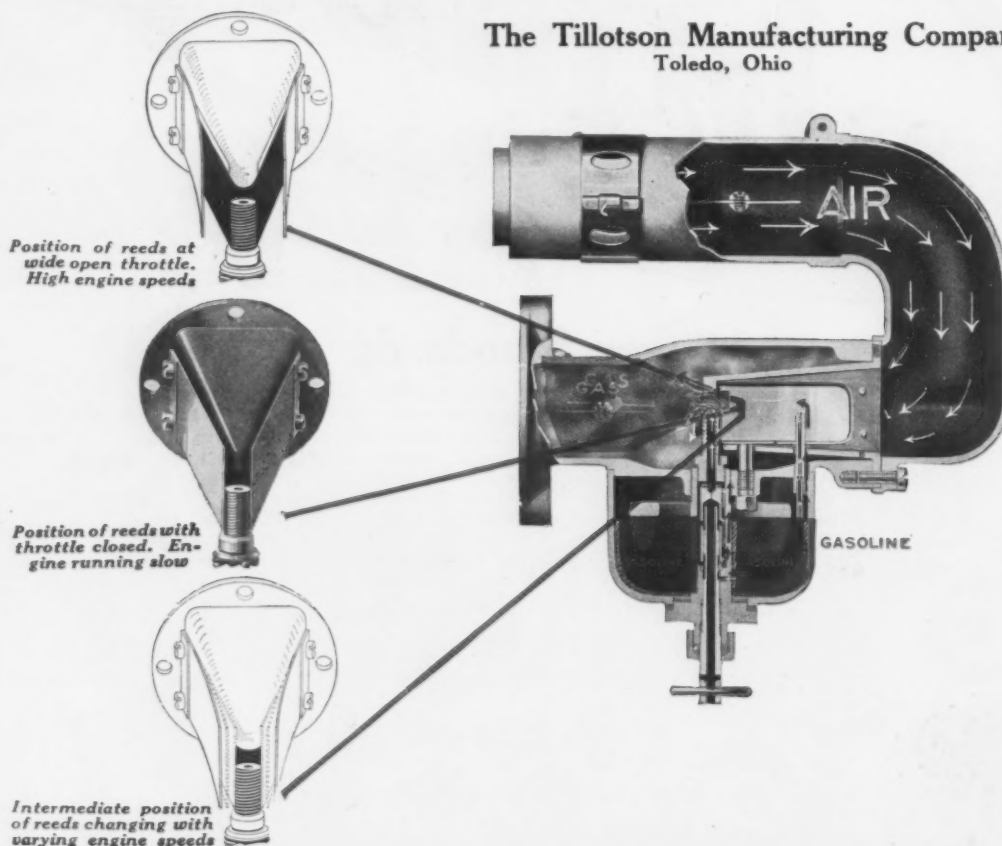
Two flexible steel reeds open and close at the fuel supply nozzle, maintaining at all engine speeds the high-

est possible vacuum and greatest air velocity at this point.

The maximum partial vacuum that the pistons create with the engine running at high speed can only open these reeds a small portion of their elastic limit and their life is practically endless.

The air valve action is but one of the dependable features in the Tillotson design that appeals to automobile engineers and manufacturers.

The Tillotson Manufacturing Company
Toledo, Ohio



HAWKEYE

1½ TON MOTOR TRUCKS



Do One Thing Right

SPECIFICATIONS

Capacity, 3000 lbs. Wheelbase, 136½ in. Body Length, 9 to 11 ft. Tread, 56½ in. Motor, Buda 4-cyl. Positive Pump Oiling System. Carburetor, Master. Ignition, Eisemann. Clutch, Dry Plate. Transmission, Sliding Gear. Tires, Solid pressed on. Steering Gear, irreversible. Frame, 5-in. channel steel. Equipment, 2 oil side lamps, 1 tail lamp, mechanical horn, complete set of tools including jack. BODIES BUILT TO MEET REQUIREMENTS.

Chassis Only, Price \$1,750
F. O. B. Sioux City, Ia.

Hawkeye engineers have concentrated on one thing—how to carry your 1½-ton loads with greatest profits, at lowest cost per ton-mile.

The result is a 1½-ton motor truck that does what it is supposed to do, right.

Use the coupon for complete details and record of Hawkeye achievement.

The HAWKEYE opportunity for *dealers* is one that means profits from the start.

HAWKEYE MANUFACTURING COMPANY

R. A. BENNETT, Pres.

SIoux CITY

IOWA

Mail the Coupon NOW →

Hawkeye Manufacturing Co.,
Sioux City, Iowa.
Send me at once complete information concerning
HAWKEYE 1½-ton Trucks.

Name
Address
Desiring our Special
Offer check ☐

Take the air to the tire!

Black & Decker LECTROFLATER

Electric Air Compressor

No. 2 Automatic Portable Tank Outfit

Takes up very little space, light in weight, easy to handle, can be wheeled anywhere—yet the tank will deliver sufficient air to inflate 10 tires from 40 to 80 lbs. pressure.

When tank becomes empty, merely connect cord to any electric light socket (either A C or D C) and the Lectroflater pump, mounted above, fills the tank again in a jiffy.

An automatic pressure switch cuts off the current when the pressure in tank reaches 150 lbs. and starts the pump working again when pressure drops to 120 lbs.

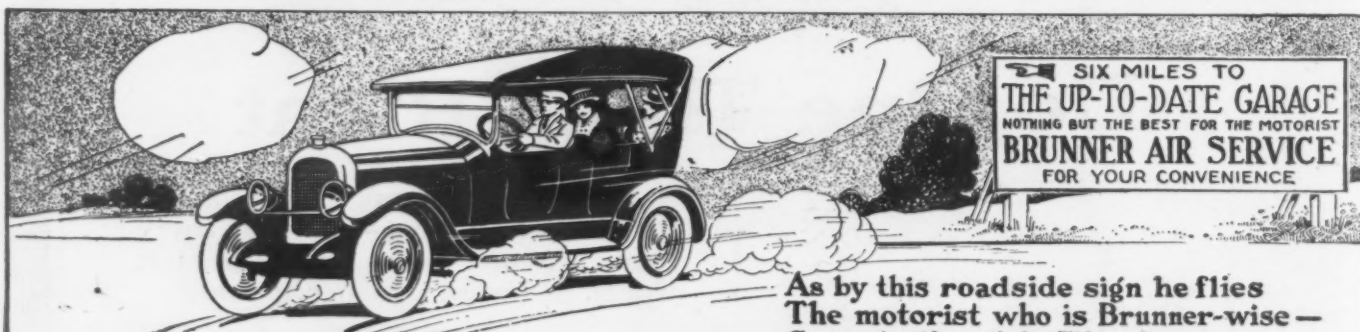
Pump requires virtually no attention. All working parts enclosed under a single housing. Grease—not oil—lubricated. Requires repacking once in six months. Scientifically air-cooled. Extremely quick and powerful, yet very economical to operate. Will inflate 10 tires at a cost of one cent for current. Built for hard service. Fully guaranteed.

Write today for illustrated booklet "A Friendly Touch." It gives complete information about the entire line of Lectroflater Air Compressors, including curb outfits. Prices range from \$50.00 up.

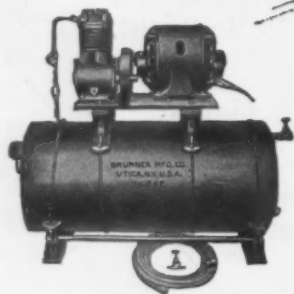
JOBBER—write for sales proposition.

Black & Decker Mfg. Co. 111 Pratt Street
Baltimore, Md., U. S. A.

Distributors in Canada, *Northern Electric Company, Limited*, Montreal



As by this roadside sign he flies
The motorist who is Brunner-wise —
Says to the girls I'll patronize
This garageman who is Brunner-wise.



As the long, lean winter months approach, Mr. Garageman, you should look around you and see if there is not some branch of your service that might be improved which would make your establishment more attractive to those who motor during the winter months—the Brunnerwise Motorists for instance—they use Brunner service—and a Brunner Sign on your garage might help some.

Investigate the **BRUNNER** Air Compressor



There are hundreds of Brunner Jobbers throughout the country—let us send you the name of the Brunner Jobber covering your town—he would be glad to tell you all about the Brunner Line. Our catalog and handbook on compressed air are yours for the asking.



The Brunnerwise Motorist

BRUNNER MANUFACTURING COMPANY

Main Office and Plant
UTICA, NEW YORK

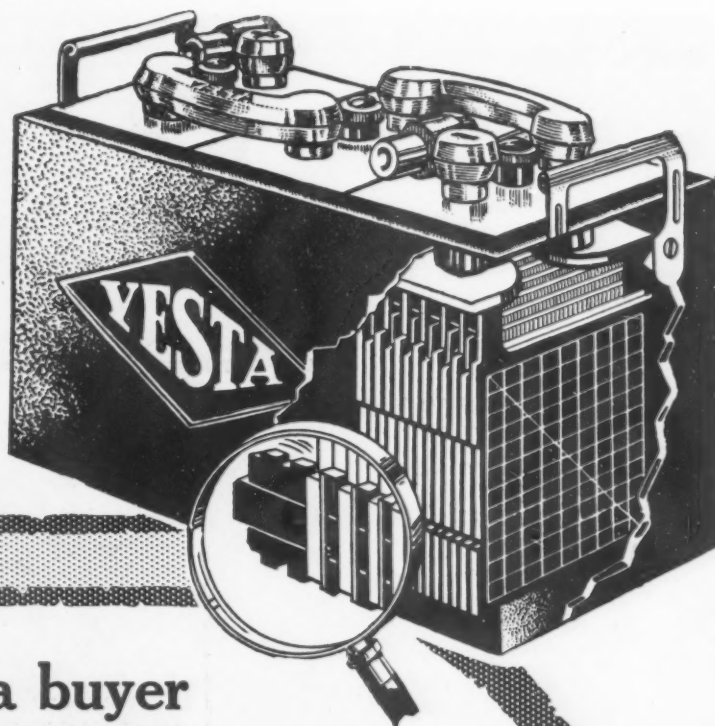
Cincinnati Branch
CINCINNATI, OHIO



The Brunnerwise Garageman

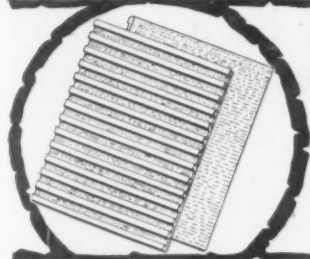
When Writing to Advertisers, Please Mention Motor Age

3 Exclusive VESTA Features. that Create a Bigger Battery Business



1

The Indestructible Isolator positively locks the plates apart and prevents short-circuits. Entirely immune to the attacks of battery acids.



2

The Impregnated Wooden Mats absorb battery acids as freely as ordinary mats and form a perfect path for the current, yet prevent "treeing" and its disastrous consequences.



3

Titanium, a rare mineral, hardens the lead plates, giving them longer life. It precipitates all minerals and impurities in solution and adds vastly to the efficiency of the battery.

When a buyer asks "WHY?"

The Vesta dealer has three good reasons to give to support his recommendation of the Vesta Battery. These three reasons appear on the left. There is nothing fanciful about them—they are sound, practical, obvious advantages. It is plain that they must mean longer life, greater efficiency, less liability to trouble.

And the reason that Vesta Batteries mean a bigger battery business for the dealer is simply because the Vesta dealer has these three great selling arguments which appeal to the judgment of every thoughtful motorist.

Motorists are learning that batteries are different and when the time comes for replacement it is well to look about, instead of blindly ordering "the kind that came with the car."

*Write for our Service
Station Plan TODAY.*

VESTA ACCUMULATOR CO.

2104 Indiana Avenue
CHICAGO

If

TWO THOUGHT DEAD IN AUTOMOBILE WRECK

Brakes Believed to Have Failed
as Car Rounded Corner
at High Speed.

Rescuers Rush Victims to Hos-
pital; Little Hope Held for
Recovery of Man and
Woman.

The curve on Fremont Street near the
Lake Shore was again the scene of a
serious automobile accident last night.



IF the brakes had only held—if GARCO had only been used—this accident would never have happened. Instead of two lives being snuffed out like a candle—instead of an inert mass of wreckage—this car would have been speeding along the road.

• Take this big IF out of motoring. Protect your customers. Back your good workmanship—build your reputation on the great wear-resisting quality built into every foot of GARCO Brake Lining.

On a straightforward, dollars-and-cents basis alone it will pay you

to investigate GARCO fully. Ask your Jobber or drop a line to us, NOW—today. Let us tell you about GARCO Brake Lining GARCO Transmission Lining for Fords and the other asbestos automobile specialties we manufacture.

GENERAL ASBESTOS & RUBBER CO.

MAIN OFFICES
and FACTORIES

Charleston, S. C.

Branches and Complete Stock: 58 Warren Street, New York

106 West Lake Street, Chicago

311 Water Street, Pittsburgh

Pacific Coast Distributors, HUGHSON & MERTON, INC., 77 O'Farrell Street, San Francisco, Calif

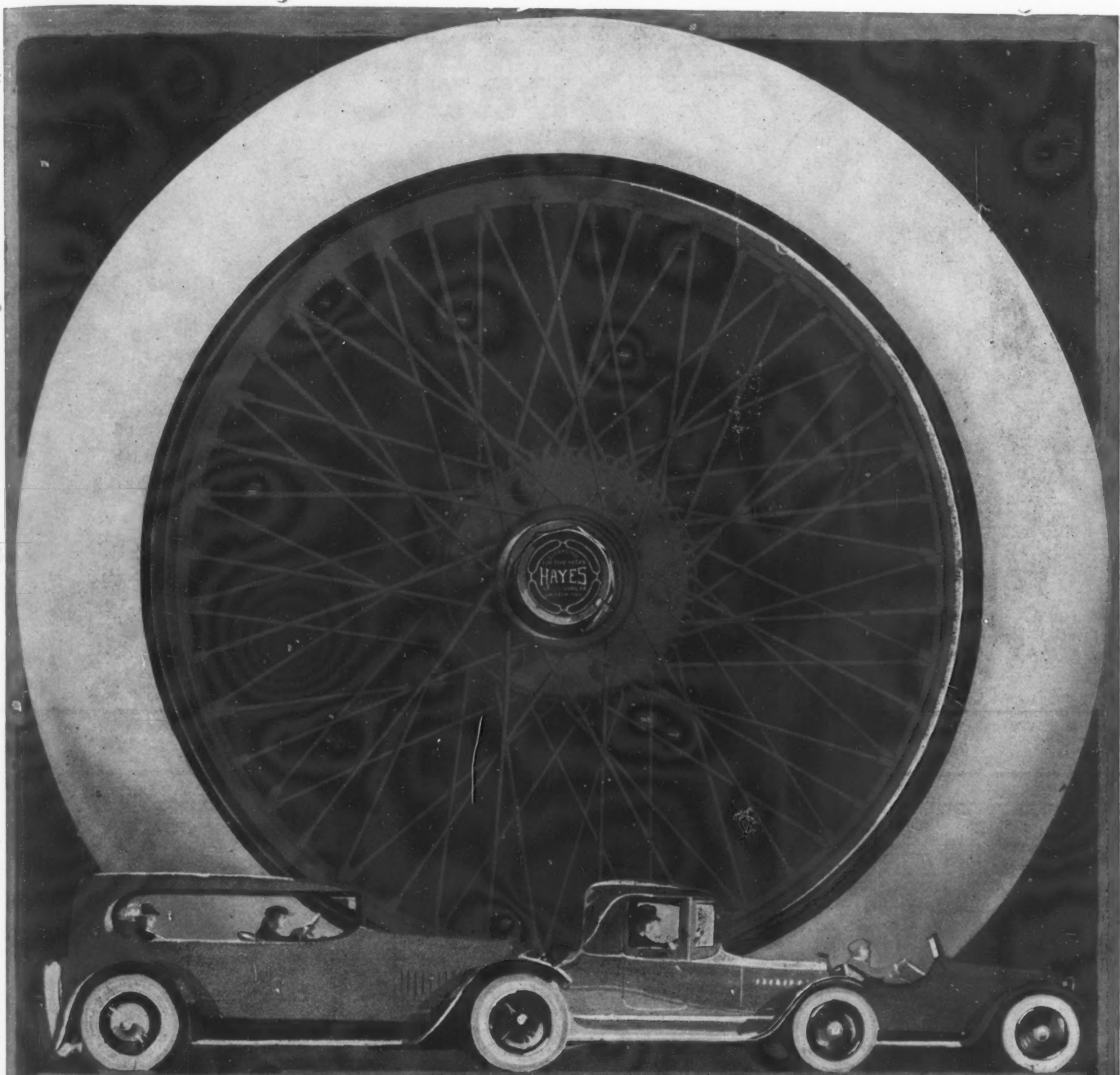
LOS ANGELES, 1229 South Olive Street

PORTLAND, 326 Ankeny Avenue

SEATTLE, 806 East Pike Street

Largest Manufacturers of Asbestos Textile Products in the World

When Writing to Advertisers, Please Mention Motor Age



HAYES WIRE WHEELS

Licensed under Patents Owned and Controlled by the Wire Wheel Corporation of America

"HAYES" Wire Wheels are constructed so that the spokes will not loosen at rim or hub, even though subjected to the hardest usage. The special steel hub construction provides extra strength, the concealed driving studs add to beauty and permanence; and the heavy brass hub caps, with automatic locks, exhibit the perfection of detail.

SALES AND SERVICE STATIONS

NEW YORK, Chadwick-Delamater Co. 159 W. 24th Street	DETROIT, E. W. McGookin 1231 Woodward Avenue
CHICAGO, C. R. Kyte, Inc. 2023 Michigan Avenue	CLEVELAND, City Auto Tire & Supply Co. E. 24th St. & Chester Av.
BALTIMORE, Baltimore Wheel & Hub Co. Gay St. & Fallsview	

CASTLE & KYTE, Exclusive Sales Agents

872 Woodward Avenue
Detroit, Mich.

A

C

Spark Plugs

The Standard Spark Plug of America

Special for Ford Cars
AC CICO



7/8" Regular
For Maxwells
AC TITAN



1/2" Regular
For Willys-Overland
AC TITAN



1/2" Regular
For Studebakers
AC TITAN

AC Plugs have proven to be the best under all conditions. That is why 80 manufacturers of Automobiles, Trucks, Tractors and Aeroplanes use them for regular equipment. The leading race drivers are using them. Your motor will not give its best performance unless equipped with AC. You will come to them in time. Why not buy a set NOW and note the improvement?

CHAMPION IGNITION CO., Flint, Mich., U. S. A.

TITAN TIRES

DIRECT FROM FACTORY

Undersell Other Dealers and
Give Bigger Values

Sizes.	Non-Skid.	Tubes.	Sizes.	Non-Skid.	Tubes.
30x3.....	\$ 7.52	\$1.90	32x3 1/2...	\$11.55	\$2.25
30x3 1/2...	9.82	2.15	34x3 1/2...	13.32	2.35
31x3 1/2...	10.27	2.20	31x4.....	14.72	2.95
			32x4.....	15.22	3.05

Our only TERMS express C. O. D. or sight draft attached to bill of lading. 25% of bill must accompany all orders. 2% discount will be allowed when you prepay full amount.

All goods shipped with privilege of examination. Sample casings must be accompanied by prepayment. No mileage guarantee.

All Sizes in Stock

TITAN RUBBER CO.
1414 Michigan Avenue Chicago



Order
Now—
Prices
Advancing

ORDER TODAY — Prices good on all orders received up to and including Nov. 24th.

A stride to the top in one year

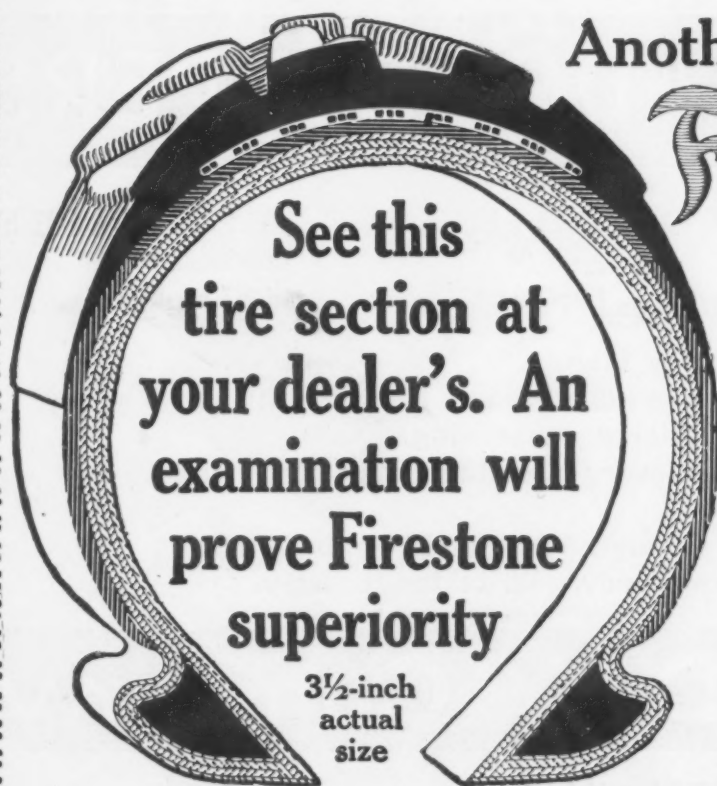
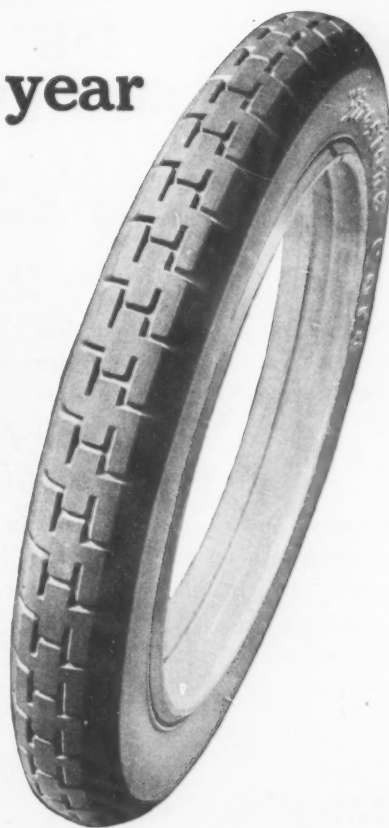
This is the record of

Firestone SUPER CORD TIRES

TALK to the users of Firestone Super Cord Tires wherever you see them. They have a message worth many dollars to you. Lower cost per mile in tires and gasoline counts big these days, so here, there, everywhere Firestone Super Cords have become the goal of motorists.

These are Firestone Super Cord features that produce extraordinary performance. Numerous walls of stout cords. Pure gum separates cords and prevents friction. Extra thick cushion layer of pure gum under tread absorbs shocks and protects inner body of tire. Tough, thick, resilient tread.

Bead, which holds tire in rim, strongly reinforced, as is also the side wall. Hinge or bending point of tire thrown high where strain has least effect. Result, Most Miles per Dollar.



Another step forward in

Firestone FABRIC TIRES

THE outstanding feature of all Firestone accomplishments is continuous advancement. Firestone never stands still. Here are the definite improvements: Tougher Tread; More Cushion Stock; More Rubber Between Layers; Reinforcement in Side Wall.

See cross section of tire at your dealer's. A brief explanation will convince you that Firestone on Fabric as well as Cord Tires means Most Miles per Dollar.

That motorists find extra values in Firestone Tires is proved by the fact that our sales increased 72 per cent this year up to September 1st. Our total business this year will exceed \$60,000,000.

FIRESTONE TIRE AND RUBBER CO.
Akron, Ohio Branches and Dealers Everywhere

DeLUXE DEMOUNTABLE LIMOUSINE TOPS

Make Chalmers Cars a Handsome and Practical Limousine Ready for Year Round Service

For Chalmers Models 35-A, B and C Touring Cars

De Luxe Demountable Limousine Tops mounted on Chalmers Touring Cars, keep them in service when they are needed most, making them comfortable and warm; does away with the old fashioned lay-up of the season and adds beauty and refinement to the cars.

***Also for Haynes—Premier—Roamer—Liberty
and Franklin Cars—1916-17 and Current Models***

De Luxe Tops are manufactured in a strictly high class manner. They are not to be compared with many of the cheap tops on the market. In design and finish they are equal to the most costly limousine, and built with the purpose of making a beautiful, combination Summer and Winter top.

The side panels are all removable; all glass used is of polished plate, ground edges; the windshield is built in, of the latest auxiliary rain vision ventilating type. The interior is neatly trimmed. The exterior is handsomely finished with sixteen coat work.

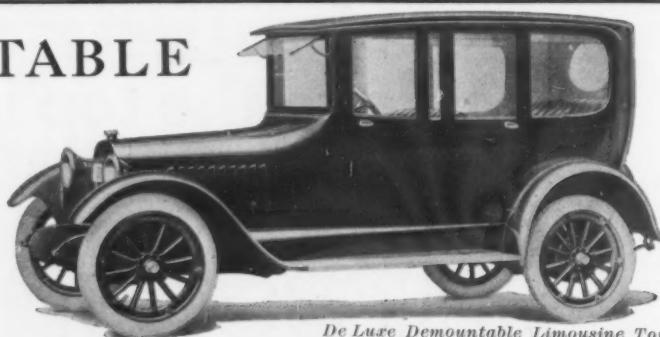
*Dealers know De Luxe equipment
because of the pressing demand*

*Write for free illustrative circular
with details and prices.*

LIMOUSINE TOP COMPANY

**1902 FACTORY
STREET**

Kalamazoo, Michigan



*De Luxe Demountable Limousine Top
Mounted on Chalmers 6-30 (35A)*



HALLADAY BUMPERS

AND AUTOMOBILE ACCESSORIES

Dealers and Jobbers Preparing Catalogs

Don't forget the Halladay Line.

Quality proven by thousands of users everywhere.

Sales made easy by national advertising.

Attractive illustrations and every assistance for displaying
in your catalog.

Distributed to the trade through recognized jobbers only.

Our new catalog is now ready. Write for it today.

L.P. HALLADAY Company.

STREATOR, ILLINOIS

DISTRIBUTORS: Asch & Co., 16-24 W. 61st St., New York City; E. L. Thompson Co., 817 Boylston St., Boston, Mass.; Gray-Heath Co., 1440 Michigan Ave., Chicago, Ill.; Sanford Brothers, Chattanooga, Tenn.; Southern Distributors; Hughson & Merton, Inc., San Francisco, Los Angeles, Portland and Seattle, Pacific Coast Distributors.

THIS MAN BUYS ALL THE MATERIAL
FOR THE HUGE OVERLAND PLANTS

**"I use The Automobile Trade
Directory constantly in pur-
chasing materials for the
Willys-Overland
Company."**



A handwritten signature in cursive script.

H. V. HAWK, GENERAL PURCHASING AGENT
WILLYS-OVERLAND COMPANY

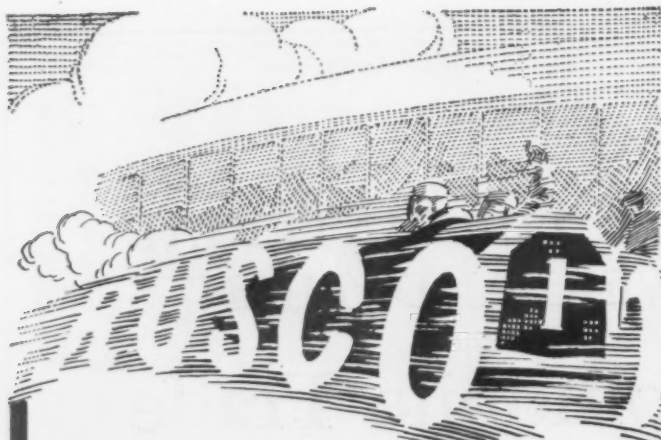


"IT HANGS EVERYWHERE"

A Thousand Catalogs in One

In The Automobile Trade Directory you have at your finger tips in permanent form complete buying information about everything that goes into the manufacture, equipment or maintenance of a motor car.

THE AUTOMOBILE TRADE DIRECTORY
ROBERT WOLFERS, President
243 WEST 39th STREET, NEW YORK CITY



The Remarkable Progress Of RUSCO PRODUCTS

Every effort has been directed toward producing the largest possible output of "Rusco" products while still maintaining their characteristic high quality.

Our enormous reserve stock of raw materials permits us to choose our new stock with infinite care; our machinery, designed and built in our own shops, has been constantly improved to keep pace with every refinement in our products, and continual additions to an already immense acreage in factory space have been made regularly, in order to meet an ever increasing demand for our output.

Behind all this extensive equipment is the high ideal, which first conceived and has since jealously guarded the reputation of "Rusco" products.

Asbestos Products

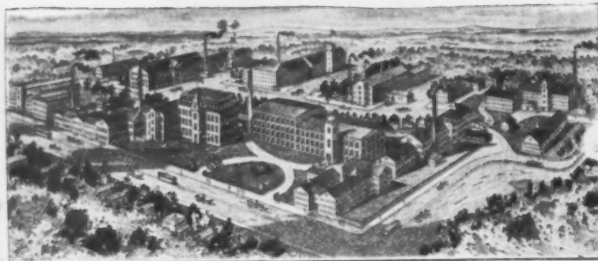
*brake lining
cone clutch facing
clutch discs*

Cotton Products

*solid woven belting
tire and trunk straps
anti-squeak web*

"Rusco" Products will give you the best service money will buy.

**THE RUSSELL
MANUFACTURING CO.**
MIDDLETOWN, CONN.



THIRTY-FIVE MILLS

MORE LITE AUTO LENSES

Is Giving Satisfaction

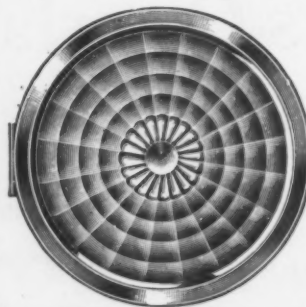
"More-Lite" Auto Lenses give satisfactory service, at a lower price than any other high grade, light diffusing lens on the market.

What more can motorists and dealers ask? They are one-piece lenses, made in either crystal or amber glass, and can be obtained in all sizes.

They comply with headlight laws of all states.

100 % Efficiency—50 % Cost

L. E. Smith Glass Co., Mt. Pleasant, Pa.



Dealers and Jobbers

Write for Special

Discounts

LIST PRICES

Diameter in Inches	Per Pair
6" to 8 1/2" inclusive.....	\$1.50
8 5/8" to 9 1/4" inclusive.....	1.75
9 5/8" to 10 3/4" inclusive.....	2.00
10 7/8" to 11 3/4" inclusive.....	2.25

PATHFINDER BANKRUPT SALE

**Monday, November 26th, 1917
at 2 o'clock P. M.**

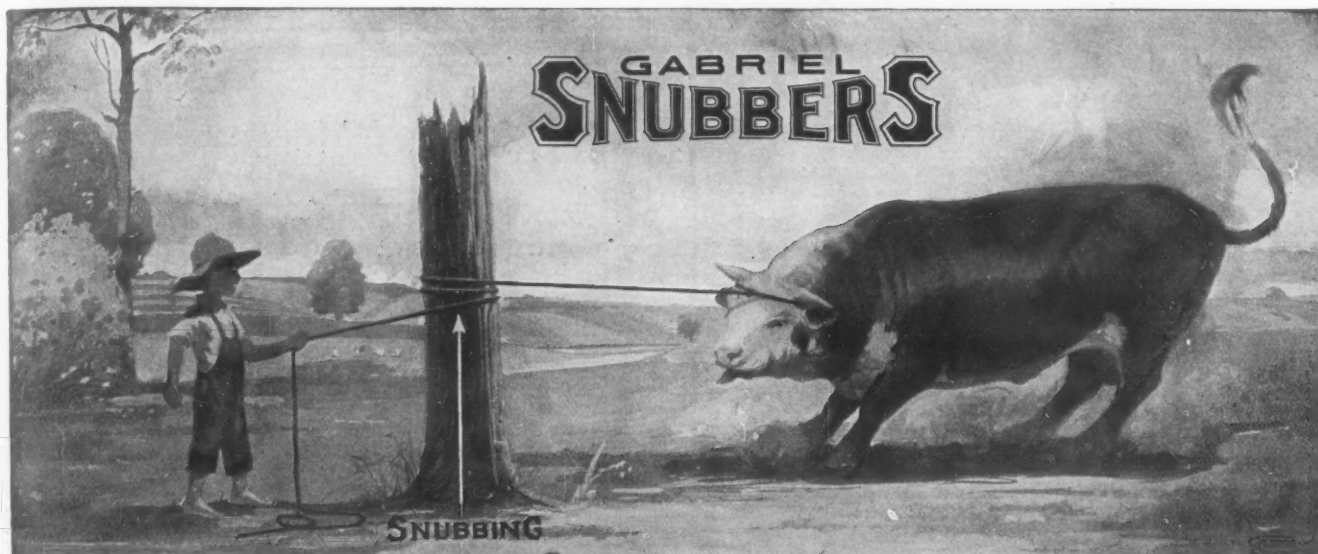
At the Factory

INDIANAPOLIS INDIANA

All assets of the Pathfinder Co. and the Pathfinder Motor Company of America, consisting of leasehold on factory buildings, machinery, supplies, automobiles, finished and partly finished, service and repair department, good will, trade-name, trade-mark "Pathfinder;" to be offered in separate lots, or combinations and as an entirety subject to the approval of the Referee, with right to reject all bids. Bidders must qualify by deposit of certified check on approved bank for \$5,000.00 to secure prompt completion of sale.

For information apply to

CHARLES MARTINDALE, Trustee
1107 Fletcher Trust Building
INDIANAPOLIS, INDIANA



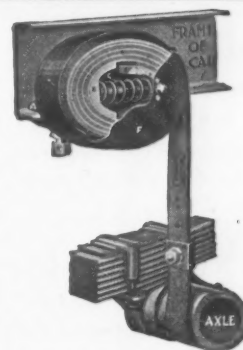
The Harder He Pulls

the tighter the rope clings to the tree and holds him

The harder your springs try to rebound, the tighter the layers coil to prevent it—equalizing road and shocks and making your car ride as easy with **one** passenger as with a heavy load.

WRITE FOR BOOKLET AND NAME OF NEAREST DEALER

GABRIEL MFG. CO., 1415 E. 40th St., Cleveland, Ohio



The Most Powerful
SEARCHLIGHT

The Most Convenient
TROUBLE LAMP

Reg. U. S. **SILVERBEAM**  **SEARCHLIGHT** Pat. Off.

*A Searchlight and Portable
Trouble Light Combined*

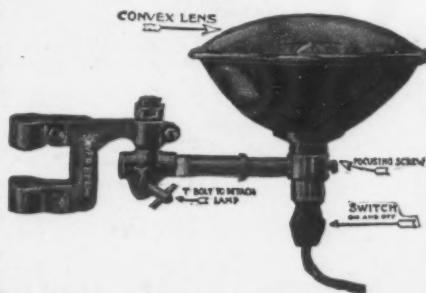
Wherever you go with your car and need a light, for driving, in camp, for fishing, for repairs, **SILVERBEAM** Searchlight is always ready for use. Besides being a most efficient searchlight—surpassed by none—it is also a trouble lamp you can carry to any part of the car, camp or roadside when you need a light.

Attaches to either side of car, on windshield or door. Black and nickel, black or nickel. Gray, red, blue, etc., on order. When ordering state make, model and battery voltage of your car.

Price
\$9.00 complete

with all connections, all nickel or all black
Dealers, write for details

Williams Mfg. Co.
310 N. Flower St.
Santa Ana, Calif.



年香者

IF you are unable to read Chinese you will not appreciate what the dealers in the Far East think of **MOTOR WORLD**. But there are nearly two score thousands of dealers, jobbers and garage owners in the United States who profit by each weekly issue. It is their inspiration, their indispensable ally in the successful conduct of their business. Hundreds of good features—here is one: In the first issue of every month we publish detailed specifications of the leading cars and trucks, and sizes and prices of the principal tires made in the United States.

MOTOR WORLD is published weekly. Two dollars for the 52 complete issues (Canada and Foreign, \$4). Get started now. Send the coupon—with letterhead or business card.

Motor World, 239 W. 39th St., New York City.

Enclosed find \$2, for the next 52 complete issues of Motor World.

Name

Address

Please send business card or letterhead to assist our Classification Department.

S-M-C

S-M-C Asbestos Brake Lining

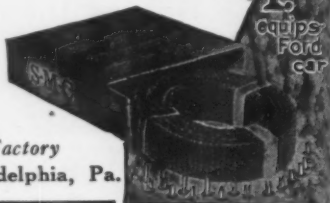
Increased Winter Sales of Brake Lining come easiest with S-M-C—the brake-lining that gives utmost satisfaction. When you take down a car and put in S-M-C Brake Lining, you know that the brakes will stand up under every test. S-M-C means Safety Made Certain.

S-M-C Set for Fords

\$1.50 is complete with three proper lengths for Ford Transmission and all rivets required. At best dealers, or by mail postpaid from

Staybestos Mfg. Co.

The "Modern" Factory
5516 Lena Street, Philadelphia, Pa.



\$1.50
equips
Ford
car

INGENIOUS,
patented pole
shoes are used in
all

HIGHTENSION SIMMS MAGNETOS

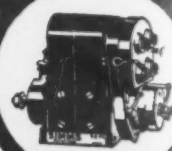
and result in the most intense spark being generated in the full retard at low speeds and in the advance at higher rates.

More power, flexibility and efficiency at all speeds.

Write for literature

THE SIMMS MAGNETO CO.

272 No. Arlington Ave.
East Orange, N. J.



HERE IT IS!

The only real way to remove nuts and cap screws. This socket wrench fits them all and you can get at them and swiftly remove them with ease and without defacing nut or screw.

BAY STATE AUTOKIT

One of the following sets will fill your requirements exactly. Make your selection.

- Set No. 1. (31 sockets).....\$10.00
- Set No. 2. (12 sockets)..... 7.50
- Set No. 3. For Ford cars (10 sockets)..... 4.00

Packed in strong, handsome box, with reversible swivel ratchet handle, universal joint, screw driver, extensions, etc.

GEORGE A. CUTTER
Sales Agent, TAUNTON, MASS.



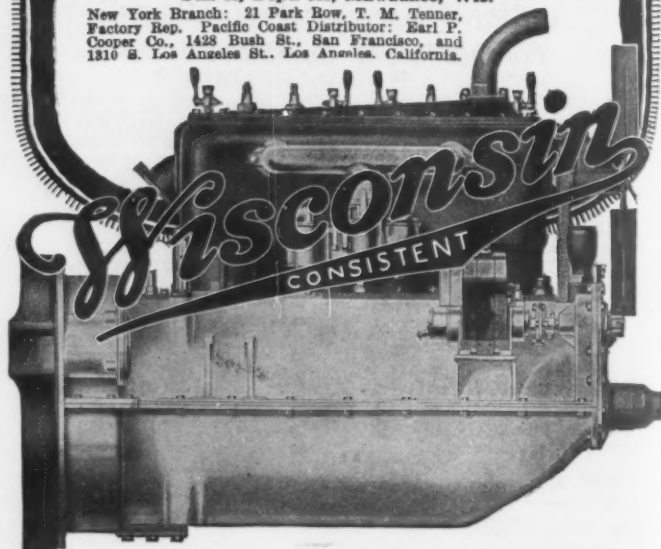
"It's A Wisconsin"

When you tell that to a truck prospect, it means something. It carries weight because nearly everybody who is interested in trucks is familiar with WISCONSIN Motors. They have a record behind them—a reputation for consistent performance even under the most adverse conditions. Correctly designed, built to a quality standard, thoroughly tested in our large, electrically-equipped test room.

Write for specifications of different types and sizes
WISCONSIN MOTOR MFG. COMPANY

Sta. A, Dept. 311, Milwaukee, Wis.

New York Branch: 21 Park Row, T. M. Tenner,
Factory Rep. Pacific Coast Distributor: Earl F. Cooper Co., 1423 Bush St., San Francisco, and
1810 S. Los Angeles St., Los Angeles, California.



When Writing to Advertisers, Please Mention Motor Age



**A New-Looking
Car May Be
Yours, With**

Pimbley's Auto-Newer—

*Cleanses and Revives
the Original Factory Finish*

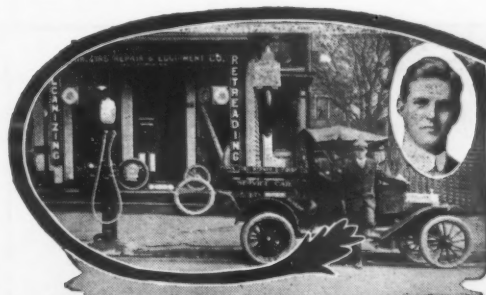
Not a heavy, pasty wax, polish or oil, to streak or "grease up" the body, but a genuine restorer of the life and beauty of the original appearance of the car. A few drops on a cheese-cloth, with very little rubbing, and your car emerges bright and fresh as the day you bought it. 50c and \$1.00.

Pimbley's Auto-Top-Newer

restores leather, pantasote or mohair tops to beauty and smartness. It is applied with a brush and does not rub off. Dries very quickly. Price 50c, \$1.00 and \$1.50.

Pimbley Paint & Glass Co.

St. Joseph, Missouri



*The
Haywood
Shop of
Paul R.
Fredericks,
Wallingford,
Conn.*

\$400 a Week

"Just a year in the business and now doing \$400 to \$450 a week at a good round profit" tells the story of this Haywood shop. Scores of men have found their independence in the Tire Repair business, have opened Haywood shops and are making big money. The coupon below or a post card with your name and address will tell you how to start.

More Men Wanted 30,000,000 Tires to Repair

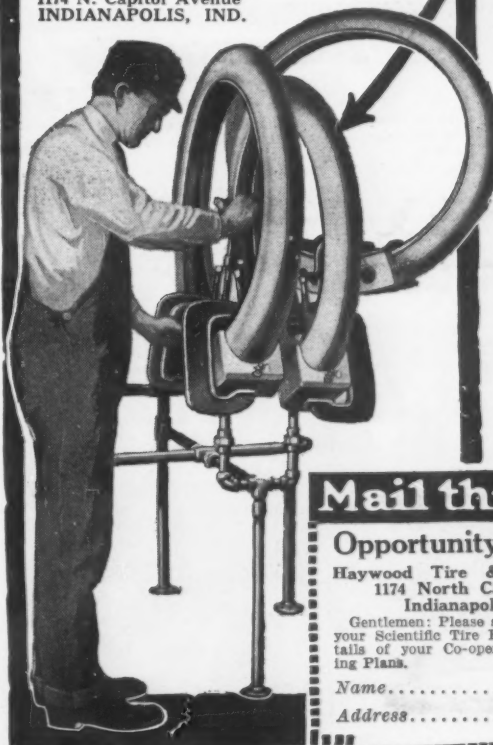
The demand for tire repairing is now so great that more Haywood stations must be established at once throughout the country. We want capable, energetic, ambitious men in charge of each—men who are dependable—competent. **You can have this opportunity. Make \$3,000 a Year or Better:**

A Wonderful Opportunity

The coupon—your name and address, brings full particulars. How to start. How to tie up with the Haywood Service. We'll give inside facts and figures about costs and profits—explain in detail our Co-operative Business Building Plans. Write today without fail. Learn how you can start at once.

Haywood Tire & Equipment Co.
1174 N. Capitol Avenue
INDIANAPOLIS, IND.

*The Money
Making
Haywood
Machine*



*Get
the Facts*

*Mail This
Today*

Mail this Today

Opportunity Coupon

Haywood Tire & Equipment Co.
1174 North Capitol Avenue
Indianapolis, Indiana

Gentlemen: Please send full particulars of your Scientific Tire Repair Service and details of your Co-operative Business Building Plans.

Name.....

Address.....

"WHITNEY" TRANSMISSION CHAINS



Silent Type

For driving Camshafts, Magnets, Lighting Systems, Generators, Pumps, Self-Starters, etc.

Our carefully constructed cylindrical joint gives a very large bearing surface, which insures accuracy, long life, and minimum elongation.

If you contemplate the use of Silent Chain, don't fail to try the "Whitney."

The Whitney Mfg. Co., Hartford, Conn.

CHAINS

KEYS

HAND MILLING MACHINES

HENNEY Commercial Bodies

*Flavored by
Ford Owners*

Our 1917 line of Henney Commercial Bodies is a "hummer"—by long odds the completest and most attractive ever offered to the auto trade.

We have also added a full line of Henney Truck Bodies for the New One-Ton Ford Truck and extended Ford Chassis.

Better let us write you about our attractive dealer offer, our open territory, quick delivery service and effective selling help. Illustrated Catalog showing the full Henney Line sent on request. Write for it. Address sales office or nearest branch.

HENNEY BUGGY Branch of Moline Flow Co.

Sold for cash direct from factory to dealer at prices that overcome competition



Sales Office:
MOLINE, ILL.

Factory:
FREEPORT, ILL.

Our line includes Commercial Fenders needed on every commercial car.

Soft Tires Are Hard on the Pocketbook
Keeping your air pressure up means keeping your tire expense down. Test your air pressure daily with a

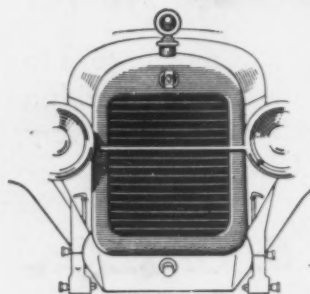


**TWITCHELL
AIR GAUGE**

and double the life of your tires.
At your dealer or
Twitchell Gauge Company
1201 Michigan Avenue, Chicago, Ill.
Price, \$1.25

—LEECE—
ELECTRIC
STARTING-LIGHTING
SYSTEM
NEVILLE

Columbia Six



THE first car to be equipped with radiator shutters thermostatically controlled.

Motor heat is motor power. Write and find out what this fact means to Columbia Six dealers.

Five Passenger Touring Car	\$1350
Four Passenger Sport Model	1495

Including five wire wheels

COLUMBIA MOTORS CO., DETROIT, U. S. A.

CAN YOU AFFORD TO BE WITHOUT THESE?

G. A. C. Auto Tire Kit

Sand and grit work through punctures and result in blow-outs. With this kit you can easily and permanently seal any hole in the shoe up to $\frac{1}{4}$ inch in the time it takes to vulcanize the inner tube. Two small and two large patches included in outfit at... **\$2.50**

G. A. C. Vulcanizing Clamp

Simple and compact, this clamp quickly and permanently vulcanizes your inner tubes, anywhere at any time at almost no cost.

Nickel clamp **\$1.25**
With 6 patches..... **\$1.75**
With 12 patches..... **\$2.25**
Extra patches, doz..... **\$1.00**

G. A. C. FOOT-REST

Send for Catalog for Other G. A. C. Money Savers

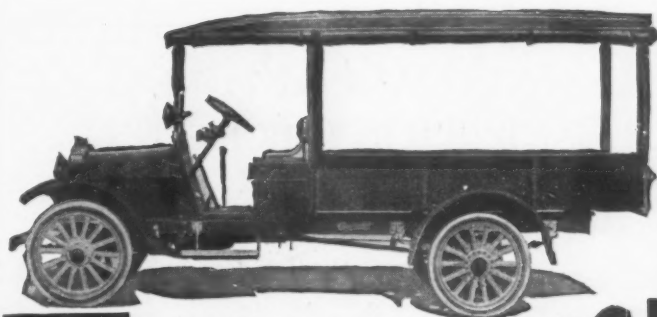


Sudden, continuous lunges on the accelerator result in hardship on the motor, and tired, aching legs. The G. A. C. Foot Rest eliminates any such possibilities. It assures you a constant, even flow of power, a definite saving of gasoline and increased comfort during long drives..... **\$1.50**

The General Appliance Co., Boston, Mass.

125 Federal Street
ASCH & CO., New York City
Eastern Distributors

GRAY-HEATH CO., Chicago, Ill.
Western Distributors



Commerce

1 Ton Trucks A Year Ahead of Other Trucks

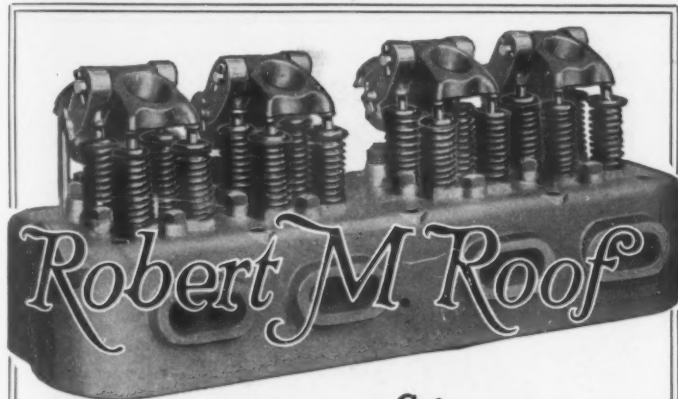
The only truck having everything necessary on it—when you buy it.

Three types of bodies for all models—Remy Starting and Lighting—Stewart Vacuum System—Pierce Governor—Windshield—Bumper. Commerce Truck Motor, Detachable Head—Torsen Rear Axle—Detroit Steel Products Company Springs.

One-ton Chassis..... **\$1340**
With Express Body..... **1375**
With Post Top and Storm Curtains..... **1450**
With Standard Stake Body..... **1490**

THE COMMERCE MOTOR CAR CO.
DETROIT MICH.

W. H. Brinkerhoff, Eastern Dist. Mgr.
Belmont Ave., Elmhurst, Long Island, N. Y.



Get 75 To 80 Miles An Hour From Your Ford With These Peugeot Type Cylinder Heads

Your Ford will ramble faster than you can drive it on the road—and it will step away ahead of ordinary Fords on the race course equipped with ROOF'S Peugeot-Type Cylinder Heads, and 3 to 1 gear ratio.

16 Overhead Valves

—almost double its valve area, and there is absolutely no back pressure in the exhaust outlet.

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A big year-'round seller. Rush season now on.
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Robert M. Roof, M. E.
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At the Hollenden, "service" isn't a catch-word—it's a definite commodity, measured exactly by the dollars you pay. It includes the best of food, the best of accommodations and the best of attention to your individual wants. It is the result of over thirty years' experience.

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For One Person
\$2 to \$5

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at various prices



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Its magnetic transmission effects a great saving in wear and tear on the motor, chassis and tires — and substantial economy in operating costs.

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"Dependable Delivery"

1¼ ton Chassis \$1245 2¼ ton Chassis \$1775

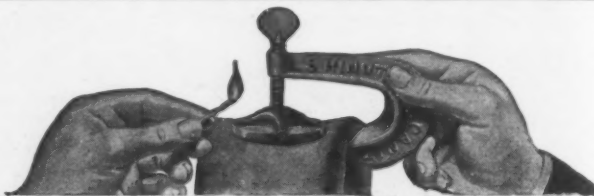
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Built to dominate the truck business in your territory—backed by the Bethlehem guarantee and a strong national advertising campaign. Is your territory covered?

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SHALER

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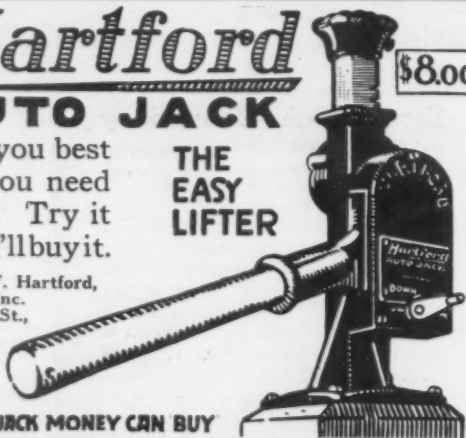
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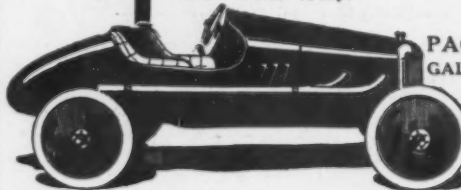
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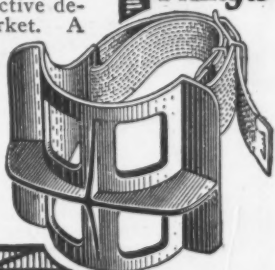
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\$1.90 per set of two. Lift the car out instead of digging it in deeper. Thousands in use. Most effective device of its kind on the market. A time and money saver. Act with steady lift which does not strip the differential gears. Made of malleable iron with strong web strap. Put on or take off in a minute. Occupy small space.

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Under Nearly Every Hood Eclipse-Bendix Drive

Transmits starting power on 150 makes of automobiles

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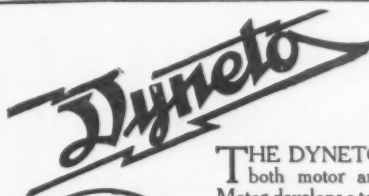
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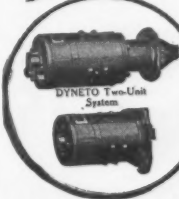
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Starter always sure to start. Lamps always bright.

Send drawings and specifications for our recommendation.

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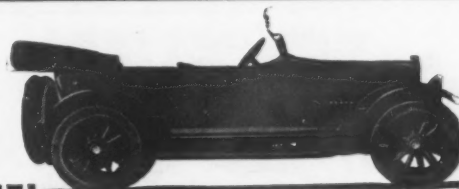
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"Your Motor's Best Friend"

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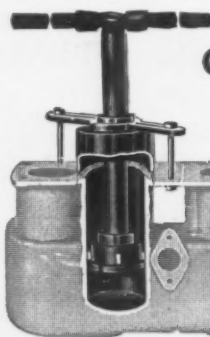
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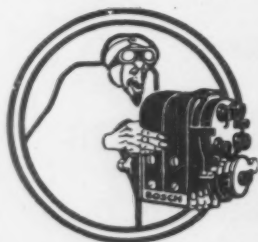
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Rebores cylinder from start to finish without slightest taper, and perfectly round. Automatic and quick in action. Takes as much as 1-16" oversize in one operation, and completed job will be a smooth finish and true to 1-1,000 of an inch. Range of expansion 2 1/2" to 5 1-16", any type motor.
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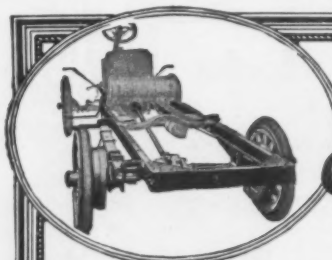
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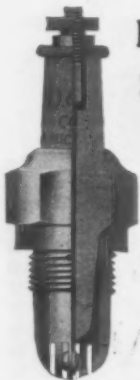
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1 and
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Commercial Chassis
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\$2

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Genuine **DUTCH BRAND** Products are readily identified by the Dutch Girl, on the orange and blue check-board label.

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To accept a substitute after once having used a **DUTCH BRAND** Product is to invite disappointment. **DUTCH BRAND** Products are guaranteed satisfactory. You run no chances.

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24 other Auto
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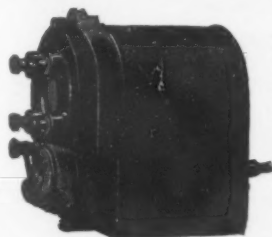
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will start your truck or automobile engine easily, without batteries, even when the poorest grades of fuel are used. Give us the opportunity of proving this statement.

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SPARK PLUGS

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\$1 Each

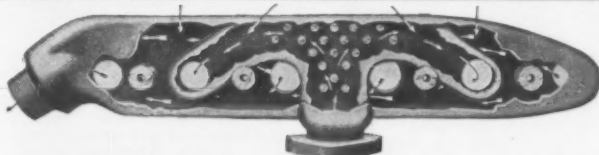
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Exhaust and Pins
Assure Uniform Heat
Treatment of All Fuel

This Hot-pin Chamber
Breaks Up All the Fuel
NO WASTE

Exhaust Gases Heat
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on All Sides



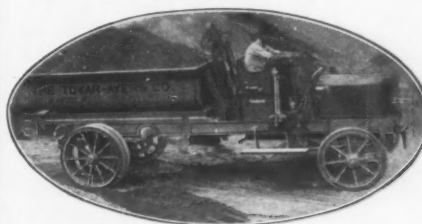
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Add to Garage Profits by Oxy-Acetylene Welding

Savings you can make will please your patrons and pay good substantial profits.

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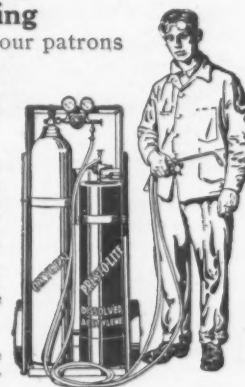
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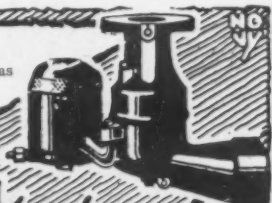
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The World's Largest Makers of Dissolved Acetylene
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Canadian Offices: Dept. N-1, Toronto, Ont.



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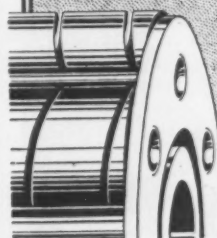
Miller Carburetor performance has proven its worth in every field. Greater simplicity and dependability—increased engine efficiency and economy—instant response to control—ability to use cheaper fuels of lower gravity than gasoline—all of



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for Motor Cars
Motor Trucks and
all Motor Vehicles

If experienced men, abundant capital and the pick of materials mean anything in motor-truck building—then there's a world of meaning for you in the words—

SANFORD MOTOR TRUCKS

Manufactured by The Sanford Motor Truck Co.
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IGNITION SYSTEMS

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TRY PHILBRIN Ignition and learn what a big difference faultless ignition will make in the performance of your car.

Made for any car—any number of cylinders.

Moderate in price. Easy to install.

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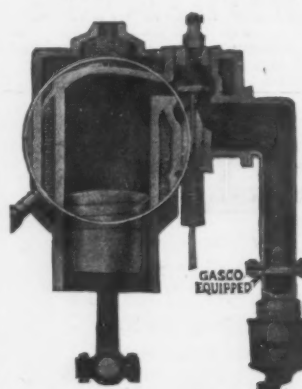


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Salesrooms— New York Boston Philadelphia Chicago



Turn Waste Space and Spare Time into Big Profits

Recharging Batteries
offers garage men a bigger opportunity for profits than anything else they can do.

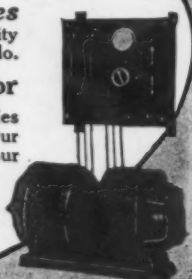
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charges from one to eight 6-volt batteries at one time. Anyone can operate it. Our 9-G Generator charges one to twenty-four batteries at a time.

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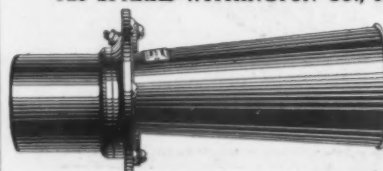


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First Choice of America's Best Cars

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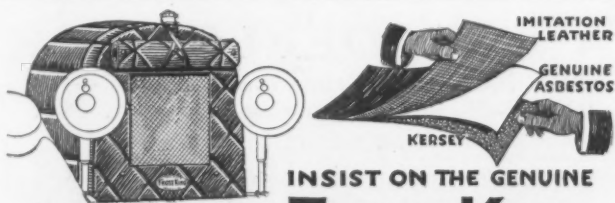


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He knows the only shock
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Save Money by Economizing Gasoline

Four floating bronze ball valves opening automatically
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any speed regardless of hot, cold, wet or dry weather.

Write for details and let us tell you why
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All-Worm-Drive

3/4-, 1- and 1 1/2-Ton—
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5-Tons

\$1425—\$1790—\$2050
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Menominee Established 1909 Michigan

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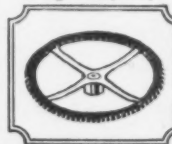
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Indestructibility, Beauty, Tilting and Hand Warming are the Povasco features that place it beyond any other Steering Wheel. Our proposition on wheels and radiator caps is interesting to distributors and manufacturers.

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Poughkeepsie,

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Plain Povasco



Tilting & Warm Hands



Radiator Caps

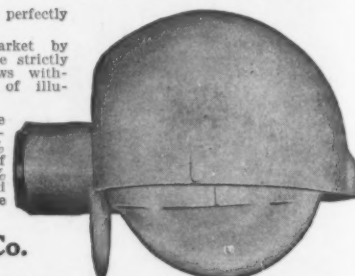
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80% More Light Below the Horizontal—No Glare—Perfect for Driving in Fog or Mist

A scientifically designed and perfectly constructed optical device.

The only means on the market by which a headlight can be made strictly to comply with non-glare laws without greatly reducing amount of illumination.

We guarantee that with the Ames Deflector a parabolic headlight reflector will project 80% more light below the level of headlight axis, and over 45% more than any known so-called non-glare headlight device on the market.



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Electric Auto-Lite equipment for automobiles is as famous for the service that backs it as for the reliability and economy of its operation.

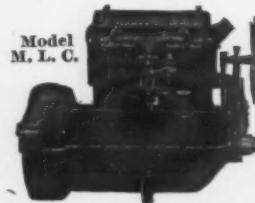
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Home Office and Factory: Toledo, Ohio

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Must have sufficient power, economy in operation, light in weight, flexible, strong and quiet. We make overhead valve motors suitable for **TRUCKS, TRACTORS, and PLEASURE CARS** and in various sizes.



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*Worth while to find out
what we have to offer*

BEAVER MFG. COMPANY

MILWAUKEE, WIS

4-Cylinder—4-Cycle

1-Ton, 1 1/2-Ton
2-Ton
3 1/2-Ton

Dealers, Write
Good Territory
Open



All
Worm
Drive

Send
for
Catalog

Basline Autowline

The Original Wire Rope Towline
For Sale by all Dealers

Manufactured by
Broderick & Bascom Rope Co. St. Louis
New York

Makers of Springs and Axles for Heavy Duty
Service for more than Fifty Years



SHELDON AXLE & SPRING CO.
WILKES-BARRE : : : : PENNA.

Names Synonymous with the Be-
ginning of the Automobile Industry.

Brown-Lipe
Transmissions

Brown-Lipe-Chapin
Differentials

BROWN-LIPE GEAR CO.
TRANSMISSIONS

BROWN-LIPE-CHAPIN CO
DIFFERENTIALS

Factories and General Offices
Syracuse, N. Y.

CONTRACT WORK DEPARTMENT

Page 129, This Issue

You will save time and money
by consulting this Department.



Selden Trucks

Light Delivery, 1, 2, 3½ and 5 Ton

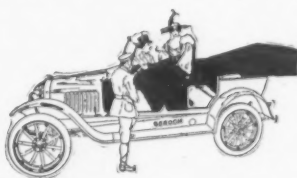
Write for full
information on
the Selden Line



DEALERS: Write
or wire for
desirable territory

Selden Truck Sales Company
Rochester, N. Y., U. S. A.

Gordon Easy-On Seat Covers



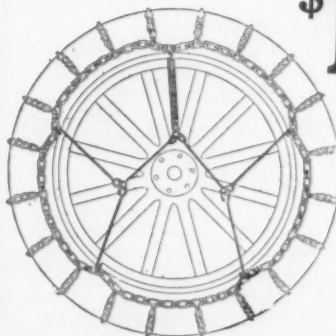
Add style, class and dis-
tinction to any car. They
are a mark of refinement
and good taste.

They give better service,
more comfort, pleasure
and satisfaction in riding
than bare leather.

They protect clothes
from soil and stain; save cleaner's bills; retain the new
look of cushions which adds to the resale value of the
car.

Ask your dealer about them TODAY, or, write the
factory for samples of materials and prices of covers
that will be "tailored to fit" your car perfectly.

THE J. P. GORDON CO.
No. 308 No. Fourth Street COLUMBUS, OHIO



\$1.00

for a pair of these
Chain Tighteners
keeps your chain from
running too loose, and
insures against losing
them.

Merchant's Anti-Skid Chain Tightener

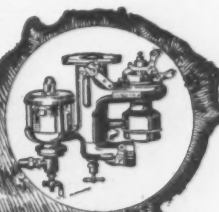
catches chain at five points, gives
even tension all around, allows
chain to creep, but not to slip,
around wheel and can be used on
any tire. A simple, light, neat,
durable device which is easily car-
ried and easily applied and means
safety and real economy.

If your dealer can't supply you,
write us direct.

M. H. MERCHANT, 236 Emma Street, Syracuse, N. Y.
New York Office: 614 Vanderbilt Concourse Building.

The "Big Stick" That Brings Down Gasoline Expense

Up goes the price of gasoline!
Maximum mileage is the
big problem of the
day! Solve it with
the new Strom-
berg Carbu-
retor.



The Official world's rec-
ords made by the New Stromberg
in gasoline mileage prove that you need the
New Stromberg on your car. Mail coupon for details
of how the New Stromberg will reduce your gasoline bills.
Stromberg Motor Devices Co., Dept. 27, 64 East 25th St., Chicago

New STROMBERG Does it!
CARBURETOR



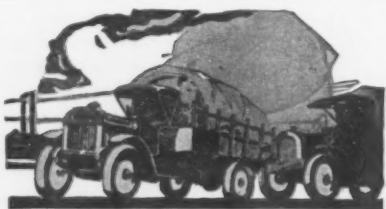
Dealers—Jobbers

Stock the fastest-selling winter accessory. Season now on. Live for sales 8 months out of 12.

UTILITY Protected Foot Rail HEATER

Sells big wherever introduced. One model fits all cars except Fords. Immediate action necessary to secure territory. Standard Model, \$15. Utility Front Seat Heater, \$10. Utility Jr. for Fords, \$7.50. Ask for prices west of the Rockies.

HILL PUMP VALVE CO.
Archer Ave. & Canal St., Chicago
Eastern Sales Office, 149 Church Street, New York
Mfrs. of the famous Utility Auto Specialties



MANLY TRUCKS—The Biggest Advance in Truck Construction of the Decade, 1½ and 2½-ton Models

DEALERS WRITE
MANLY MOTOR CORPORATION
WAUKEGAN, ILL.

TOMAHAWK SPRING LUBRICATOR



Inject Graphite Lubricant between the leaves of the springs and get 100% easier riding from your car, without squeaks and danger of breaking springs. The Graphite works into the pores of the steel and makes a polished bearing between each spring leaf. It lubricates indefinitely. The Tomahawk can be inserted with the pressure of the fingers or a light tap of a hammer, if body of car is jacked up. Regular size, price, \$1.25. Large size to lubricate a car on one filling, price \$2.50. Tomahawk Graphite Spring Lubricant sufficient for 3,000 miles, price per tube, \$0.50, also packed in display boxes, one doz. each.

Charles W. Manzel Co., 310 Beard Ave., Buffalo, N. Y.

DETROIT BATTERIES

Last approximately six months longer than the average battery. They are about 15 per cent more powerful in proportion to size and cost.

This is why their sale is now increasing on an average of over 60% every four weeks—a record no other battery has even approached.

Detroit Battery Co., Detroit, Mich.
Eastern Branch: 68th and Broadway, New York City

Mr. Dealer

One dealer in a town of 3000 people installed Forty Sets of

"The Improved Emergency Brakes"

last March. Another dealer in a cross-roads town installed twenty-five sets this summer.

All you need to do is to show a Ford owner this Brake and he buys it. Simple to install, no holes to drill. Why not cash in on this fast selling accessory?

WRITE FOR OUR DISCOUNT AND BIG SELLING PLAN.
Retail Price, \$10.00 Per Set

L. A. LEATHERS COMPANY, Brookville, Pennsylvania



CURTIS AIR FREE FROM OIL

MOTORISTS Have CONFIDENCE IN THIS SIGN

LET THEM FIND IT AT YOUR DOOR.

Curtis Air means more mileage, because Curtis is the only air compressor that can't flood cylinder with more oil than it can use. Oil is the enemy of rubber. It rots tires, causing blow-outs.

A Curtis Compressor is Dependable
requires practically no attention, costs very little, quickly pays for itself, always delivers the kind of cool, clean air that makes tires last longer.

5 sizes and 125 combinations. Write for full particulars and let us tell you why the Curtis will prove to be your best investment. Ask your jobber for prices—but be sure and mention Curtis—the name is your protection against substitution.

CURTIS PNEUMATIC MACH. CO. 1527A Kienlen Ave. St. Louis, Mo.
Branch Office: 530 N. Hudson Terminal, New York



WATER PROOF MOHAIR TOP DRESSING

Waterproofs Leaky Mohair Tops—And Dyes Them Black

AT ALL DEALERS



Used the World Over

SKF

Quality and Service

Inter-State

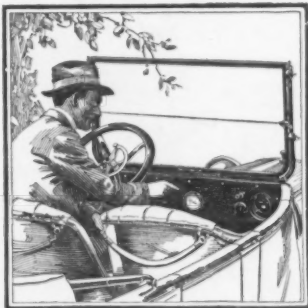
Use Less Gasoline

Actual signed service reports show that the average mileage per gallon of gasoline among Inter-State owners is 17.27 miles. Drive an Inter-State car and use less gasoline.

Sell the Inter-State and save your customers gasoline. Write for our dealers' plan.

\$850 to \$950

INTER-STATE MOTOR COMPANY
MUNCIE, INDIANA



Delivery Problems Are Solved by *Standard* WORM DRIVE TRUCKS

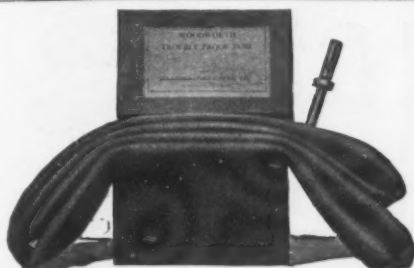


2,
3½
and
5
TON

Prompt deliveries of all capacities. Quality, price and demand insure good business. Write for our proposition.

GOOD TERRITORY OPEN

STANDARD MOTOR TRUCK CO., Detroit, Michigan



The toughest stretchiest non-tearable long-wearing, non-leakable tubes made are the Woodward Trouble Proof Tubes. Pure red rubber antimony cured.

WOODWORTH TUBES

DEALERS have found these tubes splendid business builders. They are practically leak proof and cross plied to prevent tearing.

Write today for good substantial proposition.

WOODWORTH MFG. CORPORATION
Niagara Falls New York

When Was Your Battery Tested?



It needs occasional attention or it will fail to work when you most need it.

USL Service Stations test all kinds of batteries free.

Take yours periodically and let them keep it up to its full strength.

U. S. Light & Heat Corporation, Niagara Falls, N. Y.



Starts the Engine Cold

Ford cars are difficult to start in cold weather without



A few drops of gasoline into the cylinders through the priming plug—and the engine hums. \$1.50 everywhere.

Emil Grossman Mfg. Corporation
Bush Terminal No. 20, Brooklyn, N. Y.
Chicago, 1253 Michigan Avenue

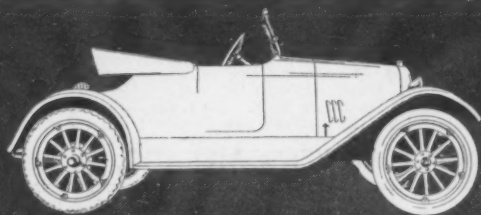


Miles Cheaper

Users Report Records of

8,000
10,000
12,000
15,000
Miles

Quaker City Rubber Co.
Philadelphia



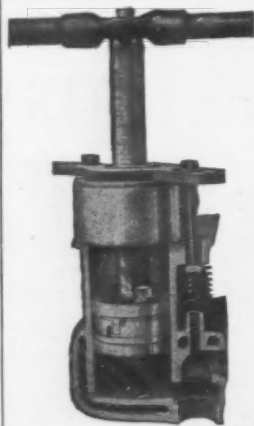
Maibohm Sport Roadster
\$795
Smart Distinctive Fast
Maibohm Motors Company
Racine Wis.

BURD High Compression PISTON RINGS

"The Accepted Standard"

BURD HIGH COMPRESSION RING CO.
"ROCKFORD, ILLINOIS"

Sales Offices in All Principal Cities.



THE STORM & O'HAIR Cylinder Reboring Machine

is adjustable and will rebores practically all makes of

Automobile, Aeroplane, Motor Cycle, Light Marine, Tractor and Stationary Motors.

It is simple, speedy and accurate and can be used by anyone familiar with tools.

Indispensable in any repair shop. We furnish oversize pistons for all makes of motors.

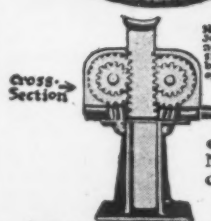
FOR SALE BY LEADING JOBBERS

For further information address

Storm & O'Hair Company
Box 226 Thompson, Iowa

REES JACK

WORM GEAR DRIVE



Handle folds here

\$8.00

A worm-driven jack, with crank handle that folds to fit in tool box. The safest, most powerful, easiest handled lifting device ever made. No springs, pawls or ratchets. No slipping back, running out, dropping under the load. No crawling under the car.

Write for particulars

THE SERVICE CORPORATION
FRICIG ANNEX PITTSBURGH, PENNA.

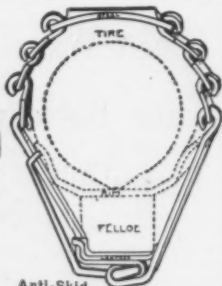
Steel Tires & Mud Chains



Old Tires Covered Complete

Special prices to those in new territory

Kimball Tire Case Co., 173 Broadway, Council Bluffs, Ia.



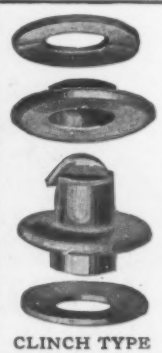
Anti-Skid
Mud chains can be put on in a jiffy with one hand while standing on the running board. Hook the ends together and push the little lever. If you get in a mud hole you will laugh out loud.

CINCH CURTAIN FASTENER

CHURCH PATENTS PENDING

The easiest operated — non-rusting, non-tearing fastener.

Write for samples.



CLINCH TYPE

NEW YORK
CHICAGO

L. C. CHASE & CO.

BOSTON
DETROIT

GEARLESS

DETROIT

CRANK-SHAFT
Tire Pump
Pat. Aug. 25, 1915

960,000 PROSPECTS

With Cars Between \$800 and \$1300

Now ready for Briscoe, Dodge, Chandler, Hudson, Overland, Reo, Stearns, Saxon 1916, and Studebaker cars. On and off in a jiffy without tools. Not a rubber diaphragm device. Write for details. Dealers, ask for discounts.

Price \$10

DETROIT ACCESSORIES CORPORATION
520 Milligan Avenue, Detroit, Michigan
Canadian Distributors
Walkerville Hardware Co., Walkerville, Ont.

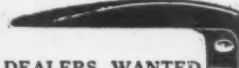
AUTO TOP ROOF COVER

Roadster, \$5.95

PARCEL POST PAID
Tailored to fit any car

Touring, \$7.95

Others up to \$15, easy to apply, you save 2/3 price of new top. We also build new and repair old auto tops and wheels.



Seat Covers, \$5 to \$25

Send for catalog and samples of the goods we use in our top roof and seat covers

DEALERS WANTED

Split Hickory Wheel & Top Co., 1189 Sycamore St., Cincinnati

CONTRACT WORK DEPARTMENT

Page 129 This Issue

You will save time and money
by consulting this Department



BROWN Impulse Tire Pump

The 7th season of success. Why bother with gears, brackets, etc., when a Brown Pump can be attached to your motor in an instant and always ready for use.

Outfit is complete with hose, gauge and self opening valve connection. Price..... **\$12**

SEND FOR LEAFLET

The Brown Co., 120 Bellevue Ave., Syracuse, N. Y.



RUBBER TREAD

FABRIC

INSIDE TYRES

Inner armor for auto-

mobile tires. Prevent punctures and blowouts.

Double mileage of any tire, old or new. Easily applied without tools. Used over and over in several tires. Will not heat or pinch. Cheaper and better than double treads, etc. Details free. Distributors and agents wanted. Sales guaranteed.

250 GULOW STREET

CINCINNATI, OHIO

AMERICAN ACCESSORIES CO.

INSYDE TYRES

KAMLEE AUTO TRUNKS

Rain-Proof-Dust-Proof-Rust-Proof
In a variety of styles for
all leading makes of cars

The Kamlee Company Milwaukee Wis.

CAR-BON-ALE

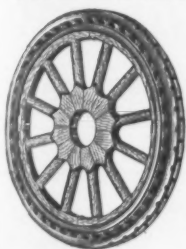
The Gasoline Economizer

Positively Eliminates Carbon-Increases Mileage 30%

Send Us \$1.00 for 100 Tablets - Enough to Last a Season-Dealers & Agents Wanted-Write

The CAR-BON-ALE CO. " " BERTRAND NEB.

The Solution of the Tire Problem



The Luverne Cushion Tire Wheel

Resilient as pneumatics and dependable as solids. Suitable for all around on service cars and for front wheels on trucks of all sizes.

FURNISHED TO FIT ANY CAR, LARGE OR SMALL

ASK FOR PRICE LIST

LUVERNE AUTOMOBILE COMPANY, LUVERNE, MINN.

Why trouble to mix oil and grease for your transmission case—when



is scientifically correct and costs less?

Oil and grease cannot stay together. The mixture separates; the oil leaks out; the grease stays at bottom of the case and leaves gears in grinding loneliness.

"K No. 00 Special" grade Non-Fluid Oil is a soft, clinging mass that doesn't melt, doesn't separate, is ALL lubricant, ALL the time. Checks Friction better than any grease ever made.

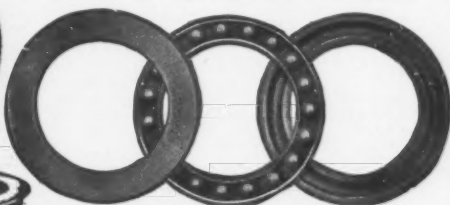
Samples and literature—FREE

NEW YORK & NEW JERSEY LUBRICANT COMPANY
165 Broadway, New York

THE BEARINGS COMPANY OF AMERICA

LANCASTER, PA.

Western Office, Ford Bldg., Detroit, Mich.



COMPLETE THRUST BEARING

Manufacturers of

STAR BALL RETAINERS for Cup and CONE, THRUST and MAGNETO type BEARINGS

RADIAL RETAINERS

MADE IN AMERICA

A Profit-Line for Winter

Motorists everywhere are looking up the live dealers and investing in one device that Makes Cold Weather Starting Easy—the

Imperial Primer \$6 Complete

Full-page advertisements in The Saturday Evening Post are helping you to make profitable sales.

Write today for our proposition

Imperial Brass Manufacturing Company
1217 W. Harrison Street Chicago, Ill.



Enjoy Motoring on All Roads

Bad roads do not worry the car owner who protects himself and his automobile with the unbreakable, soft-riding

Keystone Shock Absorbers

A set of these attached to the springs means comfort and a certain reduction of 75 per cent in up-keep cost.

Price per set \$20

Write for booklet

Steel City Electric Company
1207-19 Columbus Av., PITTSBURGH, PA.



22-73 Series

They follow closely the lines of the preceding series, and the only changes are in the nature of refinements.

22-73 Touring
22-73 Sporting
22-73 Runabout
22-73 Raceabout
22-73 Touring Limousine

Literature Mailed on Request

MERCER AUTOMOBILE CO.
800 Whitehead Road Trenton, N. J.




TRUCK MOTORS

Give longer, more efficient service because of Chrome Nickel Steel Crankshafts and Waukesha Bearing Metal—two exclusive features found in no other motors. Write for catalog M.

Waukesha Motor Co.
221 Factory St.
Waukesha, Wisconsin

NON-BURN ASBESTOS BRAKE LINING



IT'S SAFE-IT WEARS

H. W. JOHNS-MANVILLE CO.
New York City
BRANCHES IN 55 LARGE CITIES

COVERS THE CONTINENT

THE CLEARING HOUSE

OF THE MOTOR INDUSTRY

FOR PARTS, ACCESSORIES, TIRES, MACHINERY, REBUILDING, REPAIRING, WELDING AND USED CARS.
ALSO HELP AND SITUATIONS WANTED AND MISCELLANEOUS CLASSIFIED ADVERTISING.

MR. CAROWNER TIRES TIRES TIRES

AT THESE

Rock Bottom Prices

	Plain	Non-Skid	Red Tubes		Plain	Non-Skid	Red Tubes
30x3.....	\$ 9.95	\$10.05	\$2.48	36x4.....	\$21.15	\$22.25	\$4.55
30x3½.....	12.45	12.85	3.15	34x4½.....	26.75	28.15	5.25
32x3½.....	13.95	14.60	3.20	35x4½.....	28.00	29.40	5.35
31x4.....	18.20	19.10	3.95	36x4½.....	28.50	30.00	5.50
33x4.....	19.50	20.35	4.15	37x5.....	33.85	35.50	6.70
34x4.....	19.90	20.90	4.25				

THESE ARE STANDARD TIRES GUARANTEED 3500 MILES

OUR GUARANTEE

THIS GUARANTEE absolutely free of any argument or dispute. Every tire is fully GUARANTEED for 3,500 MILES. An adjustment is based on 3,500 MILES of SERVICE. If any tire is found defective in material, workmanship, or has not fully rendered 3,500 MILES of satisfactory SERVICE, when subjected to ordinary road conditions, tire will be cheerfully replaced on following conditions: 35 miles each day on 30x3 tires, 40 miles per day on 3½-inch tires, 45 miles per day on 4-inch tires and 60 miles per day on 4½- and 5-inch tires. All adjustments made off consumers' list price. Tires worn in unusual service, abused knowingly or unknowingly, injured through accident, misuse or damages due to under-inflation not covered by this GUARANTEE.

OUR TERMS

We ship all goods C. O. D., subject to examination upon receipt of a 10% deposit, and if the goods do not meet with your approval, upon receipt of same, WE INSIST that you return them and we will refund your money.

**GIVE US A TRIAL ORDER TODAY — YOU
MAY RETURN GOODS IF NOT SATISFACTORY**

MR. DEALER

WE HAVE TERRITORY OPEN—GET IN LINE

FOR BIGGER PROFITS!

WRITE OR WIRE QUICK!!

For Territory and Proposition

REMEMBER

A STANDARD TIRE—3,500 Mile Guarantee

CRESCENT TIRE & RUBBER CO., Kansas City, Mo.

Is Your Car Here? Within the Last Two Weeks Our Mechanics Have Taken Apart the Following Cars: :

Studebaker 1913, Model AA 35, 7-passenger touring
 Reo, 1913
 Cadillac 30, 1910
 E. M. F. 30
 National, 1913
 Chalmers 1911, Model M
 Everett 30, 1912

Hudson 33, 1911 and 1912
 Maxwell L.R., 2 cyl.
 Overland 79, 1914
 Overland 59, 1912
 R. C. H., 1912
 Studebaker Six, 1915
 Velie, Model 5-R, 1914
 White 30, 1910

Oakland 40-42
 Overland 69-79
 Overland 52-53
 Overland 54-71
 Overland 81
 Pierce-Arrow
 Pope Hartford
 Packard 30
 Patterson
 Regal 40—R. C. H.
 Reo 1910-1911

Reo 1912-1913
 Speedwell
 Stoddard Dayton
 Studebaker 25-35
 Velie 40
 Warren Detroit
 Winton 1909-1914
 Brush
 Gleason } Limited
 Lambert } Assortment
 Carter

RADIATORS

Before shipping out we have a radiator expert test and guarantee against leaks. We crate them carefully and get them to you in good shape.

\$15 to \$30

BOSCH MAGNETOS

We are doing a big business in Bosch's. Besides all the ordinary types, we have a few 2-spark (double-distributor) D Sixes, dual. Also several ZR Sixes, dual, with coils.

STARTERS—GENERATORS

Gray & Davis Starter for Ford, with attachments\$35.00

CRANKCASES

CRANKSHAFTS

CYLINDER BLOCKS

REPAIRS

Here is a list of other cars we can furnish parts for:

Abbott
 Apperson 4-6
 Auburn 4-6
 Buick 10-32
 Buick 33-35
 Buick 31-25
 Buick 17-19
 Buick 39
 Cadillac 1909-1911
 Cadillac 1912-1913
 Case
 Chalmers 30 K—30 M
 Chalmers 36-18
 Detroit
 Dorris
 E. M. F.
 Everett
 Firestone

Flanders, 3 speed
 Ford T.
 Garford & Haynes
 Hudson 20-33
 Hupp 20-32
 Jackson
 Kissel
 King & Knox
 Krit
 Lexington
 Marmion
 Maxwell 22-30
 Maxwell Special
 Mitchell 1911-1912
 Mitchell Baby Six
 Moon 6-40
 National
 Oakland 6-60

MOTORS

As cars of all makes are driven to our doors and offered to us daily, we are in close touch with the used car market and can buy for you almost any make or model of motor. By placing the balance of the car in stock we can afford to sell motors at a very low figure.

Among the motors we have now on hand are:

Buick 10	\$50.00	Hudson 33	\$100.00
Buick 33	65.00	Hupp 32	125.00
Cadillac 10	75.00	Overland 79	75.00
Cadillac 11	85.00	Premier Six	125.00
Chalmers K	85.00	Velie 40	125.00
Everett 30	50.00	White 30	100.00

At \$10 to \$50 Each

A large assortment of rear axles and transmissions.

Write, Wire or Phone Us

U. S. MOTOR PARTS COMPANY

"The Used Parts House of America"

401-406 East Eighteenth St., KANSAS CITY, MO.

Facts Every Car Owner Should Know Before Buying Used Parts!!

THE AUTO PARTS CO., Inc. ST. LOUIS, MO. DAVENPORT, IOWA

WE { Wreck cars, that we could sell second handed. W { TO OBTAIN GOOD PARTS.
 { Have a department to inspect all parts. ? { TO OBTAIN ONLY GOOD PARTS.
 { Have a method of racking parts that is perfect. H { TO ASSURE PROMPT SERVICE.
 { Never lose a customer. Y { WE DELIVER THE GOODS!

For the following makes of cars and many others we have complete parts

BUICK, Models 10-17-19-25-29-27-14-39-40.
 CHALMERS, Models F-K-M-30-36-40.
 CADILLAC, Models 1909-1910-1911-1912.
 MAXWELL, Models A-AA-AB-D-K-E-I-G-22-Mascotte and Special 2.
 MITCHELL, Models T-R-K-H-S 6 cyl. 1912, 6 cyl. 1915.
 OVERLAND, Models 30-31-38-49-42-52-59-41-69-80.
 STUDEBAKER, Models EMF 30, Flanders 20-4-14-1915-25 and 1913-25.

Auburn 1911 and '12, Bergdoll, Chase, Courier, Crow Elkhart, Dorris, Elmore, Everett 30, Glide, Garford 30 & 40, Jackson 35 & H, Jeffery, Krit, Lozier, Marion 1912, Moline, Midland, Marathon, Moon, National, Ohio 1910, Oakland 25 & 40, Olds, Perry, Premier 6, Packard 1907 to '10, Rapid Truck, Regals 1909 to 1914, Ramblers, Reo 1910 & '11, R. C. H., Studebaker 35, Staver 1913, Stoddard-Dayton, Velie '10-40 & '13, Cole 30, 40, Paige, 25-36, Stutz, Imperial, Stearns and Stearns-Knight.

GEARS!!

GEARS!!

GEARS!!

We have received a shipment of TEN TONS OF GEARS. For all makes of cars. Send us your old gears, and let us match them.

UNHEARD OF BARGAINS!!!

MOTORS!!

PARTS!!

COMPLETE ENGINES

Mitchell 6, 1912.....	\$100	E. M. F. 30.....	\$ 50
Flanders 20	50	Kline 6 cyl.....	125
Cadillac, 1909	65	Hudson 33	125
R. C. H.	50	Jeffery	100
Overland, 42	80	Imperial	125
Mitchell, T. 1911.....	75	Premier, 6 cyl.....	125
Cadillac, 1912	90		

Will sell most any part from these engines. We have a large stock of engines and will trade engines with you.

Our catalog is ready for your inspection. Write today for same. Not only will this list the stock on hand, but it will aid you in ordering any parts that you may need, for it explains all in detail, and if you will follow instructions, it will do away with all delay.

When You Want the Right Goods at the Right Prices **WIRE—PHONE—WRITE**

THE AUTO PARTS COMPANY (Inc.), St. Louis, Missouri, Davenport, Ia.

When Writing to Advertisers, Please Mention Motor Age

BUY ONCE AND YOU'LL ALWAYS BUY FROM MAXWELL BROTHERS

READ OUR GUARANTEE AND YOU'LL REALIZE WHY

We **GUARANTEE** a square deal. We **GUARANTEE** Prompt Service. We **GUARANTEE** absolute satisfaction or you get your money back. Others say 50% to 80% saving. We say we will give you higher quality at a lower price than any of the others anywhere will quote you.

In the face of these facts, who are you going to deal with?

We can make our guarantee because we are one of the largest auto-parts houses in the world and consequently buy in larger quantities at less money. Prove our statements at our risk.

We Have in Stock, Parts for All Models and Makes of Automobiles. Our Stock Consists of MOTORS, TRANSMISSIONS, AXLES, CRANK SHAFTS, CRANK CASES, Etc.

Below is but a partial list of cars for which we can supply all parts.

Cadillac, 1909 to 1914	Glide-Warren-Detroit	King, 1911, 1912, 1913	Atlas-Speedwell	Michigan-Halliday
Chalmers 30—F. K. M.	Locomobile-Knox	Paige 25-36—Empire 25	Mitchell, 1908 to 1914	Apperson-Marion
36-40—Master Six	Interstate—Jackson	Standard 6—Metz	Thomas, all models	International-Staver
Studebaker—Garford	Abbott Detroit	Stevens-Duryea	Great Western—R. C. H.	Lozier—4 & 6
E. M. F. 30—Flanders	Courier-Glide	Midland-Wayne-Welch	Oldsmobile Special	Winton 6
Dorris, 1906 to 1909	Buick, 10-17-19-30	Selden	Limited-Autocrat-De-	Premier 4 & 6; Atterbury;
Peerless, 1906 to 1913	Moon 30-40-45 & C	Stearns, 30 to 60	fender—42 and 43	Alco
Stoddard-Dayton	Maxwell, all models to 13	Kissel 4-6	American Underslung 30	Commerce Truck; Knox
Cole, 4-50-1913; 6-1913; 30-	Packard, 1905 to 1912	Matheson 4-6	to 50 Scout	Marathon
1912; 40-1914	Pierce-Arrow, 1907 to 1912	Amplex, all models	Case 40	Detroit
Marmon, 1909 to 1912	Hudson, 20, 33, 37, 6-54	Pope Toledo—Winton 6	Haynes—Carter Car	Velle
National 4, 1910 to 1913	Ohio-Regal, 20-30	Oakland 30 & 40	Overland 38-40-41-42-56-59-	Rambler
Franklin, 1905 to 1911	Bergdoll-Staver	Pope Hartford	60-69-71-45-46-51-54-55	Stearns-Knight
Hupp 20 K	Allen, 1915 and 1916	Reo, 1908 to 1914	Pratt-Firestone-Columbia	

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Vandeventer Trust Company or any Automobile Company in St. Louis, as to our financial and business standing. We are a reliable house—not a small fly-by-night junk man. Tell us what you want and let us quote you prices. You will buy from us if you do.

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WE HAVE SERVICEABLE PARTS AT A SAVING OF **50 to 80% OFF**

Factory's List Price—Look 'Em Over. Standard or Orphan Make. We have parts for all the following makes of cars, and a great many others:

Apperson 50-40	Cutting 35T & 40B	Imperial 31-34	Mitchell T-J-H-K- & 6	Studebaker
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Brush	Elmore	Jackson 23-33-35-40 & 50	Ohio	Staver Chicago
Buick F-10-16-17-19-25-29-31-37	E.M.F.—Studebaker 25	Krit 2 and 3 speed	Oakland 24-25-33-35-40 and 42	Stevens U & X Six
Cadillac 1909 to '14 inc.	Everett 4-30—Brush	Maxwell 25	Oldsmobile 50 and 60	Stoddard 30 and 50
Carter Car	Flanders 2 and 3 speed	Marathon 1914	Overland 37 to 79, inc. and 82-6	Velle 30 and 40, 1909 to '12, inc.
Chalmers F-K-M-J 36 and 18	Fords, T, R, N, S	Marion	Cylinder	Warren-Detroit
Cole 40	Franklyn	Mason Pratt 40	Paige 25 and 36	
Columbus Firestone	Great Western	Maxwell A-B-I-E-K-G &	Pierce-Arrow	
Columbia	Halliday	Mascotte & Mercury	Rambler 34-54	
Commerce	Hudson 20-21-33	Midland	Regal 30 & Underslung	
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We have listed above a great many cars for which we have parts. However, we are wrecking cars each day which cannot be listed.

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OUR "SERVICE." When your order is received, it is turned over to the order department, where the order is recorded. It is then delivered to the shipping department, where we have men, who do nothing but gather parts and fill the order. It is then sent for INSPECTION, by EXPERTS, who either mark the order O. K. or reject same, if not properly filled. This insures you against any wrong parts being sent; it avoids all delay, and through an efficient method of this kind, we are able to have your order on the way to you, 3 hours after we receive same. This is SERVICE.

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Buick	Imperial	Pope Hart-
Cadillac	Interstate	ford
Carter	Jackson	Premium Six
Case	Kelly Truck	Rambler
Chalmers	King	R. C. H.
Cole	Kissell	Regal
Crawford	Knox	Reliance Truck
Crow	Krit	Reo
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Drummond 8	Marathon	Speedwell
E. M. F. 30	Matheson Six	Stafford
Empire	Maxwell	Stearns
Everett	McFarland	Stevens
Firestone	Menominee	Stoddard
Columbus	Truck	Dayton
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50 to 80% Off

Manufacturer's List Price

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Buick	Krit	Pierce-Arrow
Cadillac	Locomobile	Premier
Carnation	Lyons-Knight	Rambler
Chalmers	McFarland	R. C. H.
Cole	Marion	Reo
Columbia	Marmon	Richmond
Continental	Matheson	Sampson
Cutting	Maxwell	Silent-Knight
Detable	Maxwell-Mascoe	Speedwell
Detroit	Mitchell	Stearns
E. M. F.	Nyberg	Stoddard
Empire	National	Dayton
Everett	Oakland	Studebaker
Flanders	Oldsmobile	Wayne
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Hudson	Paige 25 & 30	

Magnetos, Motors, Transmissions, Rear systems. We have parts for many make machines too numerous to mention here. We wreck cars daily. When ordering, state model and year of your car, if possible, also send your old part.

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Axle Shafts—Transmission and Differential Gears—Motor Parts—Universal Joints—Piston Rings, Etc., Etc.

FOR ALL CARS

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Bulletin No. 33

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You Are Not Here

Therefore, in order to convince you, we offer the following proposition. If, upon examination, the parts do not fulfill your expectations, you may return same for we give

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Let Us Convince You

Place order today while our stock is complete.

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Chalmers 36-40	Rambler
Cutting T35-T55	Stoddard Dayton
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E.M.F. 30	Carnation
Michigan	R. C. H.
Firestone	Jackson 35
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Krit	Abbott-Detroit
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Apperson 1912-13	Reo (2 cyl.) 1912
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ALL IN EXCELLENT CONDITION

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INDIANAPOLIS INDIANA

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AUBURN	MICHIGAN
BADGER	MIDLAND
BERGDOLL	MILLER
BERKSHIRE	MOON
BUICK	MOLINE
CADILLAC	MOYER
CARHART	NYBERG
CASE	OAKLAND
CARNATION	OHIO
CHALMERS	OMAHA
CHEVROLET	OVERLAND
COLE	PAIGE
COREJA	PALMER-SINGER
COURIER	PARRY
CRESCENT	PARTIN-PALMER
CROW	PATHFINDER
CROXTON	PENN
CUTTING	PATERSON
DAVIS	PILOT
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GLIDE	STUTZ
GRANT	SPHINX
GREAT WESTERN	STANDARD
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HAVERS	THOMAS-DETROIT
HENDERSON	VELIE
HENRY	VIRGINIAN
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K-R-I-T	

All parts are new, and fully guaranteed as to material, workmanship and fit. 90% of our prices are from 10 to 50% below factory prices, never any higher. Liberal discount to garages and repairmen. 190 Page price list upon request. No repair shop complete without it.

Auto Gear & Parts Co.

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All Classified forms are now closing Friday, noon. Be sure all orders and copy are mailed to reach us not later than Friday morning.

MOTOR AGE

Parts and Repairs.

**WICHITA AUTO
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We have parts on hand for the following cars:

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Chalmers F-K-L-Six-10-11-M	Mitchell 40
Clark 40	Moon 40
Cadillac 1909-1910	Michigan 40
Cameron	Monarch 40
Detroit	Metz
E. M. F. 30	Overland 30-32-35-38-41-42-52-59-69-79-83
Enger 40	Oldsmobile 40
Flanders 2 & 3 speed	Oakland 2 & 4 cylinder
Fal Car	Paige Detroit-Roadster
Fuller	Premier
Ford N-R-S (only)	Regal 30
Great Northern	Reo 2 & 4 cylinder-5th
Halladay 40	Rambler 34-40-53
Haines 1910	R. C. H.
Hupp 20	Rider Lewis
Hudson 20	Saxon
I. H. C. 2 & 4 cylinder	Sellers
Jackson 2 & 4 cyl. 45-	Stoddard Dayton
Olympic & Majestic	Studebaker 25-14
Krit	Vellie 30-40
Kissel Kar	Winton
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**TO ALL OWNERS OF
Maxwell-Briscoe
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**MAXWELL 6-50 MAXWELL 4-35
FLANDERS "SIX" BRUSH
COURIER-CAR COLUMBIA
COURIER CLERMONT
SAMPSON "35" MOTOR CARS
ALDEN-SAMPSON TRUCKS**

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**Auto Electric Equipment
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Send us your magneto, coil, generator or starter that you want repaired. First class workmanship. **24 HOUR SERVICE.** Prices reasonable.

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Remy box coils.....	6.00
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FOR IMMEDIATE DELIVERY

We can ship immediately differential and transmission gears for the following cars:

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**Special 3 to 1 Gears for Fords
More Speed—Less Vibration—More Mileage
\$12.50 the Set
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By dealing directly with us you save from 30 to 50% on new radiators and receive a high grade guaranteed Honeycomb radiator that has all the qualities required for efficient service. Our radiators have been adopted as standard equipment by automobile manufacturers who desire quality.

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Auto Parts

**FULL STOCK OF PARTS FOR
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We maintain a complete stock of parts for the above cars

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We manufacture a specially designed camshaft for the Ford car, also grind Ford cylinders and fit them with piston rings, wrist pins and bushings at only \$11 per set of four.

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Springs, Gears, Bearings, Wheels and Parts for almost any make of car.

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GEARS FOR ALL MAKES OF CARS.
SEND IN YOUR OLD ONES.
THE DAYTON AUTO PARTS CO.

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Tanks, genuine, new, full—B, \$8.00; E, \$6.50. A deposit of 25% required on all orders.

Batteries—150 Starting and Lighting, \$5 to \$15.

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Well Made—Write for Our List Today

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Works: Boonton, N. J.

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Parts and Repairs. Rebuilding and Repairing.

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50 to 75% off List Price; all parts for all makes. Motor: Continental Un. Power Plant, \$75; Buick 25, \$55; EMF, \$50; many others. Additional 10% discount to garagemen and repairmen. Phone 2787.

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D4, \$14; DU4, \$16; D6, \$17; DU6, \$19
Parts for a Hundred Different Make Machines.

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Standard makes guaranteed 3,500 miles
30x3 1/2.....\$10.75 34x4.....\$17.50
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Satisfaction Guaranteed or Money Refunded
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Over 500 Piston Patterns
Always in Stock

Our Expert Mechanics and our Highest Grade Equipment are your guarantee for highest class workmanship.

Our Special Light Alloy Pistons

Will Give You More Power—More Speed

Auto Engine Works

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WE GRIND CYLINDERS FOR \$1.50 AND UP according to condition of cylinder.

Cylinders reground and fitted with special heat-treated pistons, Pondelick's Self-Adjusting Anti-Leak Rings, new wrist-pin, hardened and ground, bushings made of genuine bronze, including fitting and assembling of connecting rod to piston for \$15.00 per cylinder.

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Visit our plant—and be convinced, or ask any where about our work.

Rebuilding and Repairing.

Cylinder Grinding

on special highest grade cylinder grinding machinery. No makeshift tools. Work handled by men with automobile factory experience. Large assortment of patterns for iron pistons. Complete stock of piston rings. Prompt service. Highest grade work only, fully guaranteed.

Aluminite Pistons

Aluminite pistons will put six cylinder smoothness into a four cylinder motor; improve a six or eight, give more power and quicker get-away. For prices, state make, model and year. Piston pins, aluminite connecting rods and racing motors. For Tractors, these pistons will greatly increase the efficiency of the motor and save the bearings.

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Complete stock—new and used—for all makes of cars. Every motor in perfect condition—no junk. We also build and overhaul motors, both automobile and aeronautical. Many a good car proves inefficient, due to motor trouble. We specialize in motor work, often changing a four-cylinder to a six, eight or twelve. Don't discard a car otherwise satisfactory, because of motor trouble. Tell us your difficulty and let us solve the problem quickly, efficiently and at a reasonable expense.

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Highest grade of work, including new pistons and rings for \$5 to \$10 per cylinder. Aluminum alloy pistons furnished at \$1 to \$3 per cylinder extra, light semi-steel pistons at slight advance above cast iron.

—\$10 SPECIAL FORD JOB—

Ford cylinders reground, new rings, bushings and wrist pins for \$10.

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We Have Specialized in
**CYLINDER GRINDING
FITTING PISTONS
AND RINGS**

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**CYLINDER-REGROUNDING
PISTONS
RINGS
PINS**

Largest in Middle West

Our complete records give Permanence and Continued Service

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Established 1897

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on automatic machinery by skilled mechanics at prices that will interest you. Gears, Axles, Valves and parts of all kinds made of high-grade alloy steel. Send us your worn or broken parts and we will replace them.

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New Pistons, Rings and Wrist Pins fitted. Patterns for nearly all makes of cars in stock, which assures prompt service. Prices right—work guaranteed. We Solicit a Trial.

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Pistons, Rings, Pins, Axles, Gear Cutting. All Auto Machine Work. Send old parts.

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Rebuilding and Repairing.

Fitted with cast iron or light pistons; leak-proof or
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plain piston rings. Best equipped shop in the country.
Quick service—reasonable prices.

Gear Cutting; Welding of All Auto Parts.
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New Pistons and Rings installed. Our prices right. Send work; efficient and prompt service.

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On all makes Generators, Starters, Magnets and Batteries. Authorized Factory Service Stations for U. S. L., Auto-Lite and Atwater Kent.

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New lightweight pistons and rings fitted. All our new pistons are

HEAT-TREATED and GROUND.

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—SCORED CYLINDERS REPAIRED—

By the Originators of the

"NICKEL STEEL ALLOY"

Electrical and Chemical Process. (Patent pending). Use same pistons and rings. No boring or grinding.

Guaranteed for Life of Motor.

Used by Leading Motor Manufacturers

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We use the same pistons. General machine work for foreign and American cars. All parts duplicated. Welding of all metals. Manufacturer of Catelain Hose Coupling, Ever-Ready Starters, U. S. Shock Eliminators. Quick service, satisfaction guaranteed.

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Your Cylinder Grinding

It is essential that skilled mechanics do your work

—Machining, Cylinder Grinding, Welding—

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customers you can reach every week by using this space. We'll tell you how economically, too.

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Rebuilding and Repairing. Tires.

Rebuilding and Repairing. Tires.

Rebuilding and Repairing. Tires.

CYLINDERS GROUND BY SUNDERLAND'S

ARE PERFECT

Magnalite or Cast Iron Pistons—SPECIAL—Ford Job \$10.00—Reground—New Pistons
SUNDERLAND MACHINERY COMPANY 1006-8-10 Douglas, Omaha, Neb.

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AND FITTED WITH ALUMINUM ALLOY
PISTONS**
SCORED CYLINDERS REPAIRED.
PROMPT SERVICE
WRITE FOR CATALOGUE AND PRICES
E. N. EGGE MACHINE CO.
PLAINVIEW, TEXAS
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CYLINDERS REBORED
By expert machinists on specially designed machines,
insuring absolute accuracy and the highest attainable
quality of finish. Special heat-treated extra light new
pistons, and re-turned rings fitted without extra charge.
Wrist pins to order. Reboring, autos, \$4.50 to \$9.50 per
cylinder; special price on Fords.
PARK MACHINE CO.
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CYLINDER GRINDING
WITH HIGHEST GRADE EQUIPMENT
either cast iron pistons and rings or our special light
alloy pistons and rings furnished. Best workmanship.
State make of car in writing.
CRANKSHAFTS REGROUND on special crankshaft
grinders—not filed and lapped, but REGROUND
STAFFORD MOTOR CO.
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"BUSINESS IS SENSITIVE"

It Goes Where It Is Invited and
STAYS WHERE IT IS WELL TREATED
We Invite Yours

We offer an unlimited supply of the following sizes, all new, fresh stock, stand-
ard makes. Slightly Mould Blemished Tires

NEW TIRES & TUBES

Size	Tires	Tubes
28x3	\$ 7.40	\$2.00
30x3	7.20	2.10
32x3	9.65	2.10
29x3½	10.15	2.10
30x3½	9.35	2.30
31x3½	9.90	2.30
32x3½	10.95	2.40
34x3½	12.80	2.75
36x3½	13.60	2.80

Size	Tires	Tubes
30x4	\$15.20	\$2.80
31x4	14.40	2.80
32x4	13.00	3.00
33x4	13.60	3.25
34x4	13.95	3.25
35x4	15.90	3.30
36x4	14.85	3.40
37x4	18.90	3.40
32x4½	19.90	3.75

ADD 10% FOR NON-SKIDS

ALL FRESH STOCK STANDARD MAKES

Size	Tires	Tubes
33x4½	\$18.15	\$3.75
34x4½	18.75	3.80
35x4½	19.60	3.85
36x4½	19.95	3.90
37x4½	20.75	4.00
34x5	22.00	4.50
35x5	22.40	4.50
36x5	23.00	4.60
37x5	23.70	4.70

SLIGHTLY USED AND DEMONSTRATING TIRES

REAL VALUES—NO JUNK

Size	Price
28x3	\$ 3.50
30x3	4.00
30x3½	5.00
31x3½	5.50
32x3½	6.50
34x3½	7.00

Size	Price
31x4	\$ 7.00
32x4	7.50
33x4	8.00
34x4	8.00
35x4	8.00
36x4	8.50

Size	Price
33x4½	\$ 9.50
34x4½	9.50
35x4½	9.50
36x4½	9.50
35x5	10.00
37x5	10.50

All Other Sizes in Proportion

Upon receipt of 10% of the amount of your order, goods will be shipped you promptly; balance
C. O. D., subject to your examination and approval. Special prices to dealers in large quantities.

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Phone Calumet 3408-1106

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Correspondence Solicited

Special Prices on New, Guaranteed Tires
Note our Special Bargains on Used and Double
Tread Tires and New Tubes.

Slightly Used and Fac-
tory Repaired Cases

Tires	New Tubes
28x3	\$3.50
30x3	3.75
30x3½	4.65
32x3½	5.25
34x3½	5.50
31x4	6.75
32x4	7.00
33x4	7.50
34x4	7.75
35x4	8.00
36x4	8.50
34x4½	7.90
35x4½	8.50
36x4½	8.00
37x4½	9.25
35x5	8.00
36x5	9.00
37x5	9.50

Serviceable
Double
Tread
Tires

Tires	New Tubes
\$ 4.15	
4.75	
5.80	
6.75	
7.00	
6.95	
7.15	
7.80	
8.00	
8.75	
9.40	
9.65	
10.15	
10.40	
10.65	
11.40	
11.50	
11.50	

10% more for Non-Skid

One dollar deposit or sufficient to defray ex-
press charges required with each order.

Shipments Made Promptly
Subject to Your Inspection

Send in your old tires to be Double Treaded;
If junk, will pay you 6c per pound.

AUTO NEEDS CO.

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USED TIRES

Sizes	Tires	Sizes	Tires
28x3	\$4.00	34x4	\$7.50
30x3	4.25	34x4½	8.50
30x3½	5.00	35x4½	9.00
32x3½	6.00	36x4½	9.00
31x4	6.75	37x4½	9.75
32x4	7.00	35x5	9.75
33x4	7.25	37x5	11.00

These tires are all standard makes in good
serviceable condition and will run 1,500 to 2,000
miles.

Send \$1.00 deposit on each of these tires ordered.
Balance C. O. D. subject to examination.

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COMPANY**

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CUT PRICES ON SECONDS

and Factory Blemished Tires of standard makes. Prices you
won't find equaled anywhere. *Straight, clean cut methods.*
Our tire values stand rigid comparison. *You may return any
tires bought from us if not sold within thirty days.*

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We are sole U. S. agents for Mastic Strain Proof Red Inner Tubes.
Guaranteed for one year. Write for prices. We sell only to dealers.

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NEW-IDEA TIRES

Real Tires That Give
REAL MILEAGE
GET THESE PRICES

Send us two worn out tires

AT OUR EXPENSE

no matter how bad and for the
following prices we will send you,
C. O. D. anywhere, a real non-skid
tire, NOT sewed on stuff, but real

NEW LIVE RUBBER

If your old tire is worn too much,
we junk it and furnish one instead.

30x3	\$5.50	34x4	\$9.90
30x3½	6.00	35x4½	12.00
31x4	7.15	36x4	11.25
32x3½	7.70	36x4½	12.65
32x4	7.95	35x5	13.00
33x4	8.75	37x5	13.75

Let us RE-TREAD your tread-worn
tires and be convinced. Some of our
customers have gotten 5,000 miles addi-
tional out of their old tires.

Dealers, write for proposition

The New-Idea Tire Company
1343 W. Girard Ave., Philadelphia, Pa.

Tires.

Tires.

Tires.

High Grade Tires and Tubes

5,000 MILE SECONDS

at the following prices without a guarantee. However, if you want a **GUARANTEE FOR 3,500 MILES**, add 20 per cent on these prices.

BEST VALUES ON THE MARKET—A Trial Order Will Convince You

Size	Plain	Tubes	Size	Plain	Tubes	Size	Plain	Tubes
28x3.....	\$ 7.00	\$2.00	32x4.....	\$14.00	\$3.35	35x4½.....	\$21.45	\$4.20
30x3.....	7.00	2.00	33x4.....	14.50	3.50	36x4½.....	22.00	4.30
30x3½.....	8.75	2.30	34x4.....	15.00	3.65	37x4½.....	22.80	4.60
32x3½.....	10.50	2.45	35x4.....	15.85	3.75	35x5.....	23.10	4.65
34x3½.....	11.50	2.70	36x4.....	16.20	3.85	36x5.....	23.95	4.75
31x4.....	13.75	3.20	34x4½.....	20.35	4.15	37x5.....	24.20	4.95

Add 10% to the above prices for non-skid tires

Order today—\$1 deposit required. Tires shipped by return express subject to examination. Specify whether Q. D., Clincher or Straight Side Rim.

ARMSTRONG TIRE & VULCANIZING CO.

1336 Michigan Avenue, Chicago, Ill.

BRANCH: 1614 MICHIGAN AVE.

Phones: Cal. 5212; Cal. 2199

HUDSON SUPER MILEAGE TIRES

OUR PROPOSITION: Within the next thirty days we will appoint about thirty men or firms in both Eastern and Western territory to represent us as exclusive factory dealers in the sale and distribution of "HUDSON Super-Mileage TIRES."

4,000-MILE WRITTEN GUARANTEE WITH EVERY TIRE

Adjustments made on mileage basis of 30 miles to 60 miles per day, depending on size of tire.

JOBBER'S LOWEST NET PRICES

Tires	Non-Skid	Tubes	Tires	Non-Skid	Tubes
28x3.....	\$ 7.25	\$1.80	31x4.....	\$14.35	\$2.95
30x3.....	7.60	1.90	32x4.....	14.75	3.05
30x3½.....	9.85	2.15	33x4.....	15.75	3.10
32x3½.....	11.55	2.25	34x4.....	16.55	3.20

DON'T DELAY—WRITE QUICKLY

A great many men will read this page. If you can qualify for one of these exclusive territories, don't delay in writing us at once, giving full information about the territory, etc., you want.

BUY WHAT YOU NEED

Any order you care to send will be cheerfully accepted and handled with all the enthusiasm that is accorded the many large stock orders that come every day. It will pay you to order in large quantities on account of the saving to you in express charges.

All orders must be accompanied by Deposit of at least 25% in order to receive immediate shipment.

HUDSON TIRE AND RUBBER COMPANY

Dept. Q, 1432 Michigan Avenue

CHICAGO

SPECIAL LIMITED SALE ON

NEW GUARANTEED TIRES AND TUBES

3,500 MILE GUARANTEE—Adjusted on a Mileage Basis

This Is an Exceptional Opportunity, as We Handle Only High Grade Tires and Tubes—All Fresh Stock. Standard Makes

Size	Tire	Tube	Size	Tire	Tube	Size	Tire	Tube
28x3.....	\$ 7.25	\$1.25	31x4.....	\$14.50	\$1.50	36x4½.....	\$21.50	\$2.00
30x3.....	7.25	1.25	32x4.....	15.00	1.75	37x4½.....	25.00	2.50
30x3½.....	9.50	1.40	33x4.....	15.50	1.75	37x5½.....	27.00	2.50
32x3½.....	10.75	1.40	34x4.....	16.00	1.75	38x5½.....	30.00	2.50

Add 10% for Non-Skid

REAL BARGAINS IN

SLIGHTLY USED TIRES AND TUBES

All in Excellent Condition

Size	Tire	Tube	Size	Tire	Tube	Size	Tire	Tube
30x3.....	\$5.00	\$1.00	32x4.....	\$ 8.00	\$1.50	35x4½.....	\$10.00	\$1.75
30x3½.....	6.00	1.00	33x4.....	8.50	1.50	36x4½.....	10.00	1.75
32x3½.....	7.00	1.25	34x4.....	9.00	1.50	35x5.....	11.00	2.00
31x4.....	8.00	1.50	34x4½.....	10.00	1.75	37x5.....	12.00	2.00

Do not delay your order! Send it at once with 10% deposit, balance C. O. D., subject to examination. We are Jobbers in all standard makes of Guaranteed Tires. Write for prices—we can save you money.

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1547 S. Michigan Avenue

Phones—Calumet 5614-15

CHICAGO, ILLINOIS

Why buy factory blemished tires when you can buy guaranteed tires at the low prices quoted here. Guaranteed for 4,000 MILES—adjustable on a daily mileage basis of 30 to 60 miles a day.

Size	Tires	Tubes	Size	Tires	Tubes
30x3.....	\$ 8.00	\$1.95	31x4.....	\$16.30	\$3.00
30x3½.....	10.60	2.20	32x4.....	16.65	3.10
32x3½.....	12.45	2.30	34x4.....	17.85	3.25

We ship on receipt of 25% with order, subject to examination, and if tires do not meet with your approval, we insist that you return same.

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Sales Dept., 1421 Michigan Avenue
CHICAGO, ILL.

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"They're Different"

Did you even consider what might be accomplished in **TAILORING INNER TUBES?**

My tubes are **TAILORED**, built for **YOU**. They **SATISFY**, as only can a perfectly tailored garment.

They **ELIMINATE** tire trouble, which is particularly disagreeable in the coming inclement weather.

Order One Today, and
CONVINCE YOURSELF

I PAY THE FREIGHT!!!

30x3.....	\$ 3.55
30x3½.....	4.10
32x3½.....	4.30
32x4.....	5.80
33x4.....	6.00
34x4.....	6.10
35x4½.....	7.75
36x4½.....	7.95
37x5.....	9.70

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C Seconds **C**
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UNUSUAL VALUES

A Standard Tire at Bargain Prices

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Real Tire Bargains

Our tires are new, fresh stock which have only slight surface blemishes, which do not affect their wearing qualities. We can not furnish a mileage guarantee at prices quoted, but every purchaser must be a satisfied customer.

Size	Plain	Non-Skid	Tubes
30x3.....	\$ 6.75	\$ 8.25	\$2.20
30x3½.....	8.75	10.75	2.50
32x3½.....	10.50	11.75	2.80
34x3½.....	12.75	13.50	3.00
31x4.....	13.75	15.25	3.25
32x4.....	14.25	15.75	3.35
33x4.....	14.75	16.00	3.40
34x4.....	15.50	16.50	3.60
35x4.....	15.75	17.00	3.75
36x4.....	16.50	18.00	4.00
34x4½.....	21.00	24.00	4.50
35x4½.....	21.50	25.00	4.50
36x4½.....	21.75	24.00	4.75
35x5.....	23.00	25.00	5.00
36x5.....	23.50	26.50	5.50
37x5.....	25.00	26.75	5.75

TUBES GUARANTEED

All goods shipped promptly. \$1 deposit required with each tire order. Balance C. O. D. subject to examination.

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Dept. D.
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Tire Users, Attention 5000 MILE

High Grade New Seconds and Slightly Used Tires at the following low prices:

New Tires	Used	New Tires	Used
30x3.....	\$7.00 \$4.00	35x4.....	\$15.75 \$7.75
30x3½.....	8.70 4.75	36x4.....	16.00 8.00
31x3½.....	9.85 5.00	34x4½.....	19.25 8.00
32x3½.....	10.40 5.75	35x4½.....	20.50 8.00
34x3½.....	11.40 5.75	36x4½.....	21.00 8.50
31x4.....	13.50 6.25	37x4½.....	21.00 9.00
32x4.....	13.75 7.00	35x5.....	22.75 8.50
33x4.....	14.25 7.60	36x5.....	23.00 9.00
34x4.....	14.75 7.75	37x5.....	23.50 10.00

Add 10% on New Non-Skid

All goods shipped promptly, \$1 deposit required with each tire order. Balance C. O. D. subject to examination.

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Phone Calumet 2553

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Our TIRES and TUBES

Mean ECONOMY to Motorists
A Trial Will Convince You

Size	Tires	Tubes	Size	Tires	Tubes
30x3.....	\$4.00	\$1.35	35x4.....	\$7.25	\$1.75
30x3½.....	4.75	1.45	36x4.....	7.50	1.75
31x3½.....	5.00	1.50	34x4½.....	7.90	1.75
32x3½.....	5.25	1.50	35x4½.....	7.90	1.80
34x3½.....	5.50	1.60	36x4½.....	8.00	1.85
31x4.....	6.25	1.65	37x4½.....	9.25	1.90
32x4.....	7.00	1.60	35x5.....	8.00	2.00
33x4.....	7.75	1.70	36x5.....	9.10	2.00
34x4.....	7.75	1.70	37x5.....	9.50	2.20

Send \$1 deposit with each tire ordered. Tires will be sent promptly C. O. D., with privilege of examination. Specify style of rim to avoid delay.

We also carry a complete stock of all makes of new tires. Write for prices.

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Size	Plain	Size	Plain	Size	Plain
32x4.....	\$ 8.65	33x4.....	\$ 9.00	34x4.....	\$ 9.35
35x4.....	9.65	36x4.....	9.85	34x4½.....	11.00
35x4½.....	11.35	36x4½.....	11.65		

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28x3.....	\$ 9.00	34x4.....	\$15.50
32x3½.....	11.50	35x4.....	16.00
33x4.....	14.50	36x4.....	17.50

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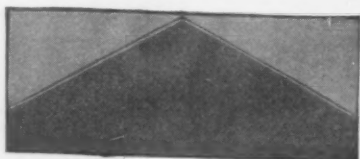
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Aluminite Pistons for Ford Cars



Patented June 5th, 1917

If your Ford had two more cylinders it would run considerably smoother and develop about 20% more power. You can get the same results by replacing the present over-weight pistons with light-weight Aluminite Pistons. They weigh less than 1/3 as much as the cast-iron pistons with which they are equipped at the factory. Tests have shown a power increase of 20% and a fuel saving of from 25 to 30%. Aluminite

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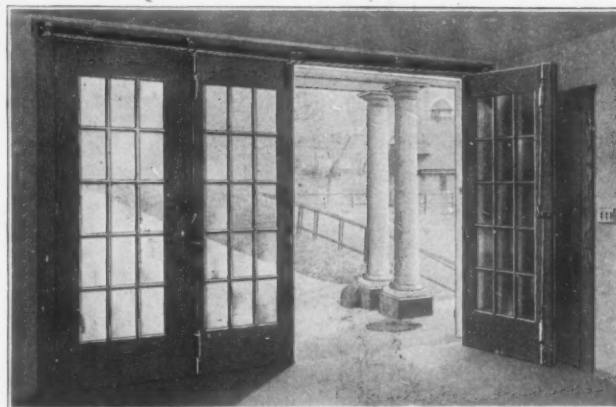
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Pittsburgh Representative
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Winter Can't Fease A Slidetite Garage



Slidetite (Patented) Garage Door Hardware

closes the doors tight like the doors in your house. Saves heat. Saves coal. Prevents starting trouble.

Slidetite Hardware operates the doors **inside** the garage. Snow and ice can't interfere with their movement. The doors can't bang in the wind.

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 "A hanger for any door that slides"

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SUNDERMAN

Vacuum Carburetor

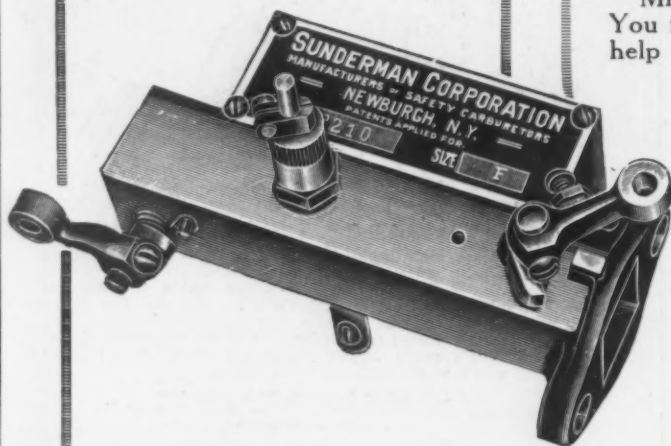
\$6

F. O. B.
Newburgh

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Start Easily in Cold Weather—and start NOW. The Sunderman is the ideal winter carburetor—and it's a winner all the year around.



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Therefore—

Send for Our Proposition—Order a Sample Carburetor—and Begin at Once to Do Your Bit

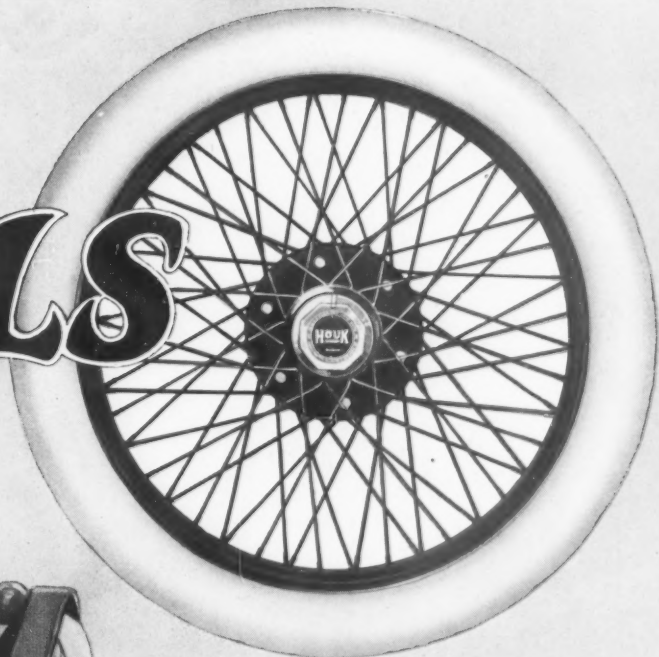
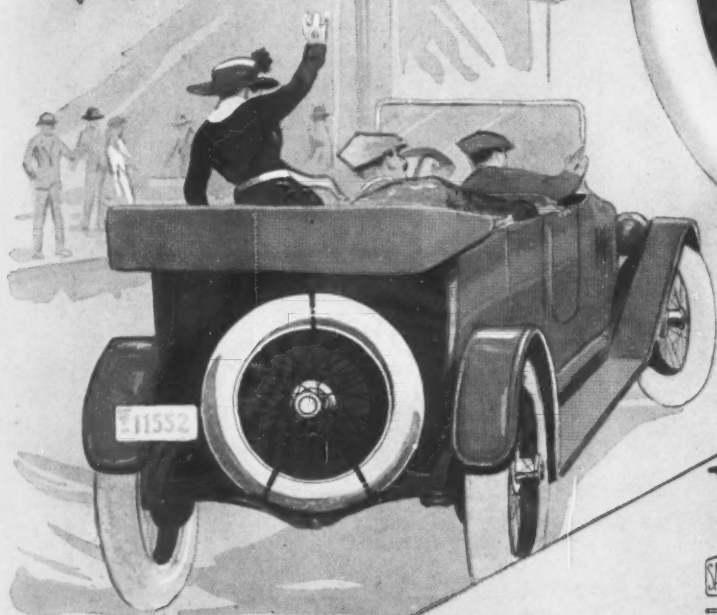
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for SAFETY

WIRE WHEELS mean safety first, last and all the time. Axles may bend, tires may come off—but wire wheels *cannot collapse*. They come through skidding accidents or collisions practically undamaged. They make incidents out of what might be deadly accidents.

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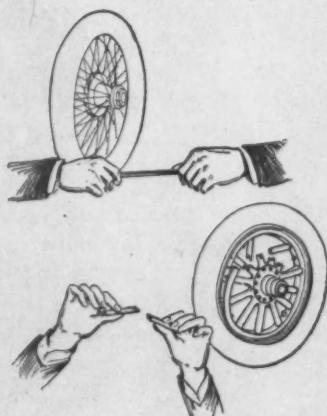
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SAN FRANCISCO, 1243 Van Ness Avenue

DEALER OPPORTUNITY

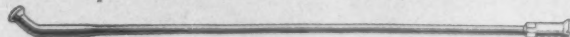
Unoccupied territory for exclusive service and sales agencies can be secured by established automobile distributors and accessory dealers.

A selling field of practically every standard make of car, with our liberal terms, offers unusual profit possibilities.

Ford agents and supply dealers should write or wire at once for special service and sales proposition on **HOUSE Type Wire Wheels for Ford Cars**.



To understand why a wire wheel can withstand any stress possible to a wheel, try to break a pencil by pulling from opposite ends. Then see how easily it is broken by bending it across. The first is precisely the way any force is exerted on the wire wheel. The second illustrates the ease with which side thrusts break the spokes of the wood wheel.





**MILLER
DEALERS
HAVE NO
PRICE CUTTING
COMPETITION
AMONG EACH
OTHER**

*A New Idea in
Tire Selling*

Miller offers an *exclusive* agency proposition to one dealer in each territory.

If you become a Miller Dealer, *all* the Miller business in your territory will be *yours*. You share it with no one. Your prices cannot be regulated by a price cutting competitor.

You get *all* the profit from *all* the Miller Tires sold in your territory. You control the business.

The big 1918 Miller National Advertising Campaign will soon begin. Big forceful advertisements in all the leading national and trade publications will create thousands of new Miller users.

But our exclusive agency proposition and national advertising campaign are but a small part of the sales plan that Miller offers its dealers. This remarkable plan has enabled Miller dealers everywhere to increase their tire business, decrease their selling cost and make larger margins of profit.

Your territory may be open. It will be decidedly worth your while to find out and to learn all about this New-Day Sales Plan. Write us today.

**The Miller Rubber Company
AKRON, OHIO**

Miller
GEARED-TO-THE-ROAD
Tires